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The Chemical Age

VOL LXIII

21 OCTOBER 1950

No 1632



*“Mind what you
meddles with—D. Barclay’s*

*grandson seeing something at Higgins’
lectures which pleased, was induced to purchase a piece of Phosphorus,
this carefully closed in paper he carried in his breeches pocket, till it suddenly
inflamed and burnt his thigh so terribly that he has been in danger of losing
life or limb but is now said to be in a fair way.”*

Robert Howard’s caution to his son Luke, the young pharmacist’s apprentice who later founded the firm of Howards, did not go unheeded. Luke Howard became a respected business

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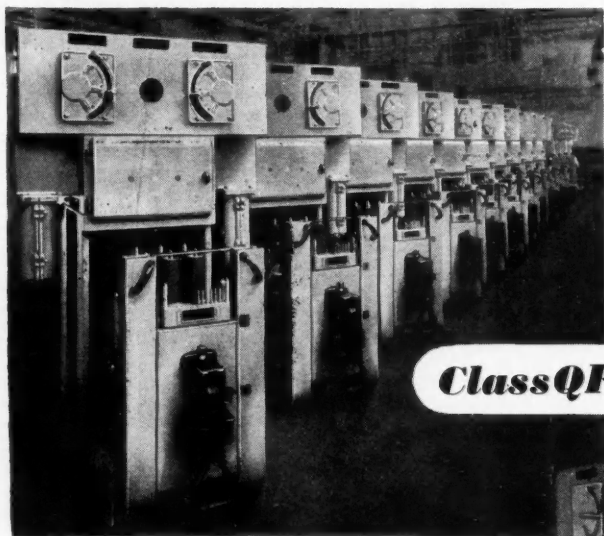
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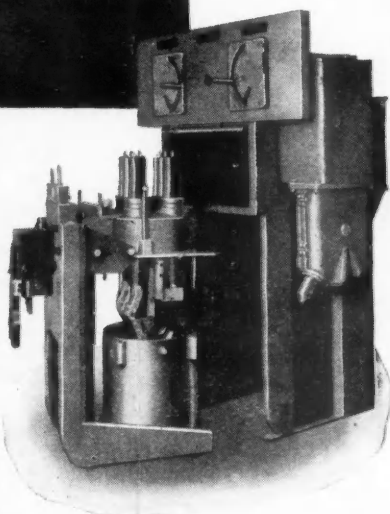
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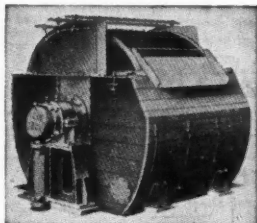
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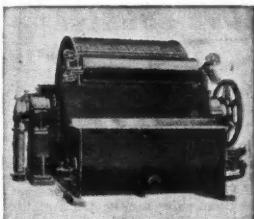
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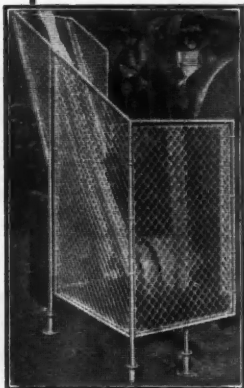
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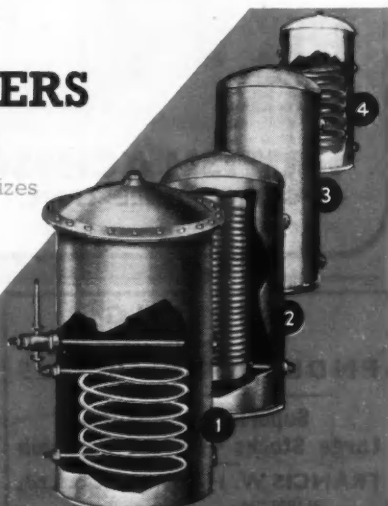
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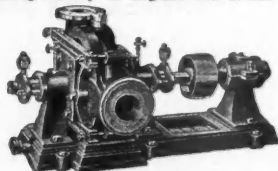
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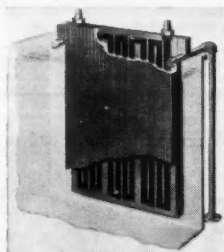
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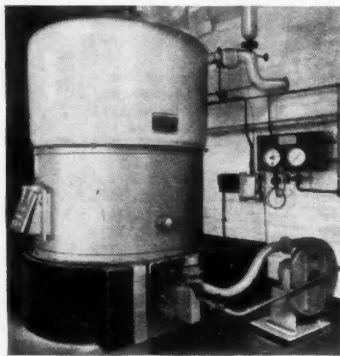
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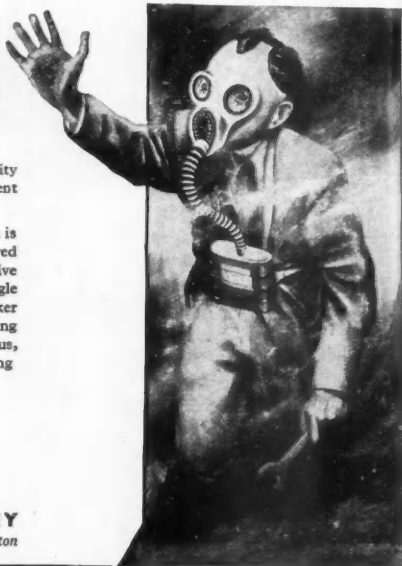
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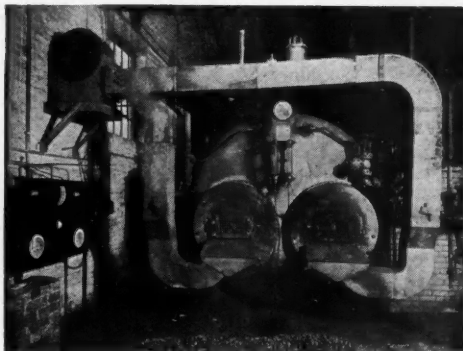
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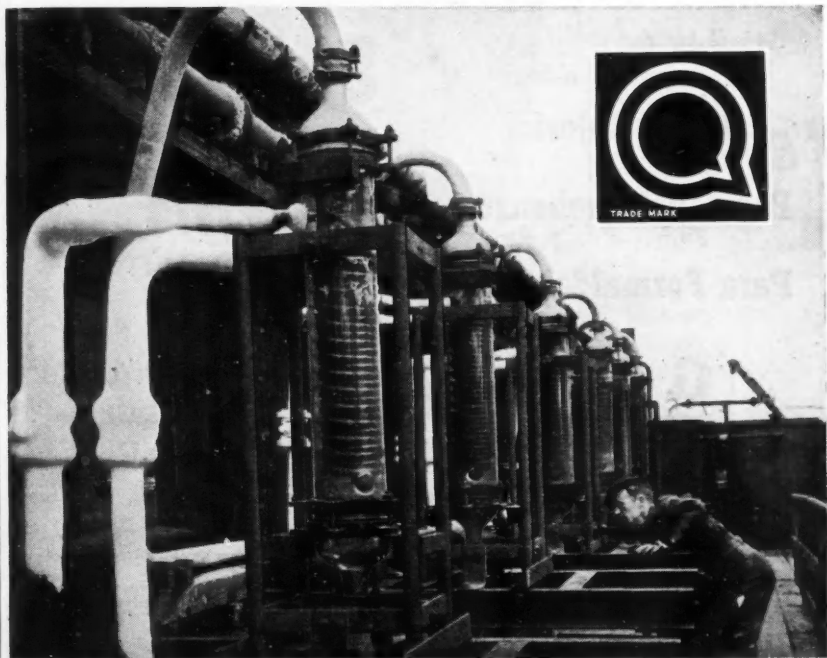
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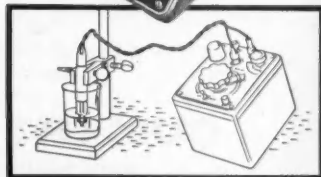
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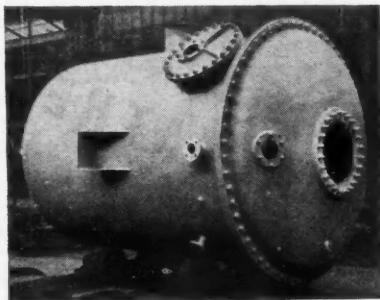
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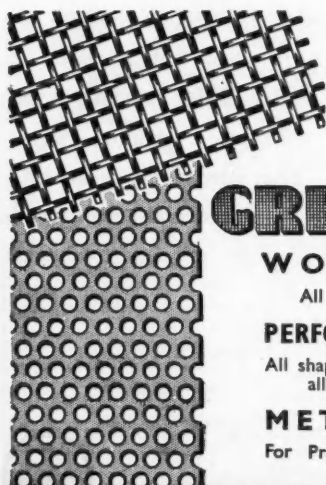
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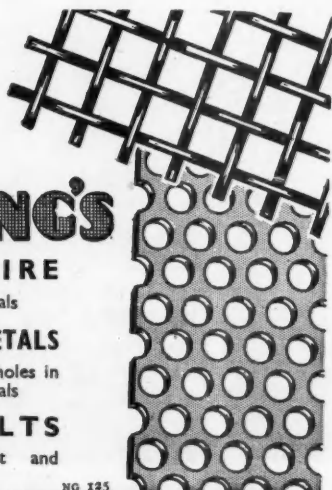
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The Chemical Age

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Dwindling Sulphur Supplies

SULPHUR, the alchemists' "fiery element," has become an especially fiery subject for British chemical industry in 1950. In the past few weeks a serious sulphur emergency has arisen. Supplies of sulphuric acid to manufacturers of superphosphate have been drastically reduced; according to statements circulating in the fertiliser industry cuts of the order of 50 per cent have been made. Even in 1940-45 scarcities had consequences less violent and abrupt, and the present situation was certainly not unpredictable. Less than 18 months ago the Committee on Industrial Productivity pointed out in its first report: "... our supplies of natural sulphur are at present drawn almost exclusively from the U.S.A. This is not only expensive in dollars, but it renders us unduly dependent on a single source of supply." One result of the heightening of international tension has been reluctance in the U.S.A. to continue exporting sulphur at anything like the pre-Korean rate, and so the sword, long suspended over British chemical industry, has fallen. The superphosphate process, requiring 11 cwt. of strong acid for every ton of superphosphate it makes, has taken the full weight of this blow.

Since the first world war, the sulphur-based process for sulphuric acid manufacture has heavily pre-

dominated. Technically the combustion of sulphur is much easier to manage than the combustion of sulphur-containing minerals of more variable composition. Nevertheless, other materials for sulphuric acid manufacture — the sulphide-bearing pyrites of Continental countries and the spent oxide of our gas and coke-oven industries—are at least near at hand. Whatever short-term merits the use of sulphur may have had, such factors as the general uncertainty of supplies, aggravated by the decline in quantity of Italian-mined sulphur and its uneconomically high cost, have called for a re-estimation of the policy. The Committee on Industrial Productivity foresaw this when it pressed for greater encouragement of the use of indigenous raw materials (anhydrite, spent oxide) and for a more balanced policy in the importation of sulphur and sulphur-containing materials. Their 1949 recommendation is now invested with an urgency which was not recognised at the time.

What has now occurred was in fact foreseen many years ago. The late Mr. P. Parrish, a frequent contributor to THE CHEMICAL AGE, drew attention on several occasions to the need of alternative sources, particularly in connection with the superphosphate industry's requirement of sulphuric

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acid. He advocated a much closer integration of the fertiliser industry and chemical sections of the gas industry so that the neglect and wastage of sulphur in spent oxide did not continue; in 1939 he predicted the recovery of 12 lb. of sulphur per ton of coal carbonised and indicated that spent oxide, containing 50 per cent sulphur, could be provided in quantity 300 per cent larger than the amount being used in acid manufacture at that time.

Manufacturers and users of sulphuric acid will naturally hope that the present contraction in our American imports will be only temporary. They will do well to remember that world reserves of raw sulphur are declining seriously. The sulphur position of countries without natural sources of their own is likely to become increasingly critical even when "strategic" controls are a thing of the past. The rapid expansion of world populations and corresponding food needs make it inevitable that the annual demand for such fertilisers as superphosphate will increase. New methods for processing rock phosphate which would greatly reduce the employment of sulphuric acid are an alternative solution requiring equal attention. From now on, the writing on the wall is apparent to all. Events

have caught up with prophecy.

Industrial chemistry has so far concentrated mainly upon natural sulphur and sulphides as materials for acid. Minerals which contain sulphur in the fully oxidised sulphate form are far more abundant, and reasonably so in the United Kingdom. Recent research by the Chemical Research Laboratory has shown that sulphates can be reduced by bacterial organisms. In some small lakes in the Libyan desert elementary sulphur is being steadily produced by natural bacterial processes. From the samples of these micro-organisms brought back to this country it is possible that pure cultures can be obtained and more active strains developed. Artificial production lakes might then become a practical possibility. The large-scale biological production of sulphur from sulphates is certainly not impossible, although it remains to be seen whether an economic rate of reduction could be secured. As so often in chemical history, the intensification of a supply problem and the first glimpse of a possible solution have arrived simultaneously.

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- First Report of the Committee on Industrial Productivity. April, 1949. (HMSO).
 "Superphosphate and Compound Fertilisers" by P. Farrish and A. Ogilvie. (Hutchinson), 1939 and 1946. THE CHEMICAL AGE, 63, 329.

Notes and Comments

Cortisone

NEWs of dramatic "cures" by the newer materials isolated by the biochemists are currently regarded with such suspicion by the experts that the confirmation by British clinicians of the "dramatic" relief of arthritic patients by the cortisone derivative of the chloric acid of ox bile was not a work of supererogation. The force of that has been made evident by the magnitude of some of the claims made in the U.S.A. for some of the related steroids, by which the search for the means of relieving countless thousands of sufferers from rheumatoid arthritis might have been diverted into false channels. We now have the testimony of eight undoubted experts of several London hospitals that 17, hydroxy 11 = dihydrocorticosterone—cortisone or "Compound E"—can in effect produce "miraculous" freedom from all the crippling disabilities of rheumatoid arthritis—for just as long as the supply of cortisone holds out. In these first trials in Britain—or in Europe—the duration was 10 days, during which four of the women patients experienced "dramatic" relief and one showed "marked improvements". The confirmation of the great hopes raised by the reports on the initial experiments in America's Mayo clinic in 1948 were made possible by yet another example of generosity from the U.S.A., in this instance from the Mayo Clinic's Dr. Philip Hench and Dr. J. M. Carlisle of the Merck Company.

Other Steroids

THE British contribution to the conclusive tests of the crystalline Compound E, the provision of several related steroids, progesterone, androstenedione, pregnenolone, and others, was perhaps no less important in the ultimate result than the precious supply of cortisone. It enabled the London clinicians to affirm beyond doubt that the related steroids are useless in their present form in the

context of rheumatoid arthritis. Progesterone alone provided any evidence which might conflict with that conclusion. The facts of which the medical witnesses have presented the usual ample and well attested proofs in the *British Medical Journal* (4684, 849-854), narrow the field in which the biochemists can be relied on to pursue this vital search for an adequate alternative source of cortisone. It will have to reproduce exactly the characteristics of the steroid derivatives of corticosterone—a double bond between the carbon atoms 4 and 5, an oxygen on carbon atoms 3 and 20, an oxygen or hydroxyl group on carbon 11, and a hydroxyl group on carbons 17 and 21.

Publicity Programme

THE forces which operate more forcibly now than ever before to oblige chemical industries to shed their reluctance to raise a voice in public have gained significant new ground. That is evidenced in particular by the inclusion in the 34th annual report of the Association of British Chemical Manufacturers (page 562 this issue) of a summary of fairly recent enterprise, which suggests a partial conversion to the doctrine that an intelligent public relations programme is a suitable part of its work. Many, aware of the misrepresentation for political ends of iron and steel, cement and some other industries, would award a much higher priority to the task of representing a true picture of chemical industries to the rest of the country, which the association's publicity committee has now shouldered. The association's first target is the BBC, whose proved willingness to present chemistry and general science subjects has inevitably accentuated the virtual exclusion of all discussion of their natural corollary, the practical use of this new knowledge in Britain's chemical producing plants. The ABCM has now had the enterprise to recommend programme themes to the BBC and is to help members make

similar contacts with Broadcasting House with some hope of acceptance. Many will hope that this rather belated token that the ABCM does not disregard the value of well informed publicity indicates the acceptance of a more liberal view of the Association's responsibility as spokesman for an important section of industrial chemistry. These proposals will certainly not go unrewarded if they banish some of the reticence which has in the past left the public more ignorant of the sources of the chemicals and intermediates of everyday use than of almost any other common commodity.

186,282 Miles a Second

THE announcement by the Department of Scientific and Industrial Research that an inaccuracy, small but significant, has been detected in a universally accepted fundamental constant by a National Physical Laboratory scientist is news which will have more than statistical interest for scientific workers. Apart from the normal implications of this discovery—that light travels at 186,282 miles a second, not 186,271—for example, the greater accuracy which the use of the new value of the velocity of light will allow in radar and radio techniques—such an admission of error in one of the three most important physical constants may serve as a salutary reminder. The acceptance of scientific calculations should always be tempered by the reflection that “this figure will suffice only until it can be shown to be wrong”. Theoretically at least, that is the traditional approach of all scientists. Many would agree, however, that there is still room for underlining the need for an element of healthy scepticism towards published scientific data, which is liable to command exaggerated respect simply because it appears in print. This is not an argument for light-hearted attempts by all and sundry to prove that the experts are wrong, or even not perfectly right. But when legitimate and reasonable doubts exist there is clear obligation at least to attempt to verify

quantitative experiments. As Dr. Essen has shown, re-investigation sometimes proves most fruitful—for those who can command the knowledge and equipment—sometimes elaborate.

Technologists' Centre

THE possibility that Birmingham will become one of the country's most active centres in forwarding the interests of applied science in many forms gains strength from the disclosure made in the city a few days ago that the well-integrated technical and scientific societies have advanced plans for a “Technical House.” The proposal to set up in the heart of Birmingham, at a possible cost of £250,000, a centre for the exchange of ideas in science and engineering is said to have the support of about 25,000 members of Midland scientific and technical societies, represented by a standing joint committee, which has already reached the stage of submitting plans to the city council. It would have a conference hall large enough for 750 auditors, larger, in fact, than some in the metropolis which have been the scene of transactions of historic importance, and several smaller theatres for gatherings of 250 or 100, and a museum. This would, incidentally, provide for the new Midland group of the Institution of Chemical Engineers a conference centre worthy of the larger scale consultation between practitioners here and overseas which the rapidly evolving concepts in chemical engineering require. The great benefit of facilities of that kind is keenly recognised in Birmingham and has been crystallised in a few words by the chairman of the local section of the Royal Institute of Chemistry, Dr. S. H. Jenkins. From such exchanges, he says, can evolve ideas more valuable than those originating in the laboratories. The Birmingham project, which is admitted to be, at the moment, more a vision than a fact, could supply the perfect counterpart of the other ambitious proposal, to provide in London a “science house” where all the scientific bodies could enjoy the same unity.

RAPID GROWTH OF CHEMICAL INDUSTRY

ABCM Chairman Foresees World Dangers of Over Production

THE acceleration this year of the rate of chemical production, reflecting the substantial headway made in the rehabilitation of chemical plants and the construction of new ones, was made evident in the course of the annual meeting in London last week of the Association of British Chemical Manufacturers.

The chairman, Sir Harry Jephcott, in his review of the association's work in relation to economic and other changes in chemical industry, recalled some significant comparisons in production figures. He called attention in the report to the Board of Trade (the Report on Chemical Industry) which mentioned that the index of production in the chemical and related trades was close on 120 in 1948, compared with 100 taken as base-line in 1946. The figure in 1949 was 123, while in the first quarter of this year there was a really substantial advance to 133.

A further advance might be confidently expected as the various schemes of expansion and rehabilitation come to fruition.

Export trade (he said) has been well maintained. Exports in the chemical group of the Trade and Navigation Accounts which were valued at £22 million in 1938, increased to £86 million in 1949. When the necessary adjustment for price changes has been made the volume of exports in 1949 was 160 as compared with 100 in 1938. From the figures available for the first eight months of this year we may expect a substantial increase over 1949 and may well reach the £100 million mark. This is a very fine performance, especially when you remember that we have carried out the instructions of the President of the Board of Trade to give first claim on our production to home demands for chemicals.

Imports

The import position is also interesting. In 1938 we imported chemicals to a value of nearly £14 million. Although this figure had increased in 1949 to just over £25 million, when price changes are taken into account the 1949 amount is only about 80 per cent of that in 1938. This year imports have risen substantially, in spite of the higher volume of production, doubtless due to increased demands from consuming industries in the U.K. Thus, for the first eight months of this year the imports were a little over £23 million; if they continue at the same rate they will top a total of £35 million for the whole



Mr. L. P. O'Brien, chairman of Laporte Chemicals, Ltd., and several associated companies, and an officer of fullers' earth and barytes organisations, who is to serve for a second year as ABCM president

year, an increase of 40 per cent on 1949. You will thus see that we have considerable scope and outlets for increased production at home as well as overseas.

As requested by the Government, we have taken an active part in the dollar drive—not, I am glad to say, without success. The U.K. published figures show that in the first eight months of this year we sold to the U.S.A. chemicals to the value of £2.6 million, compared with £1.13 million in the corresponding period of 1949.

For Canada the progress is even greater. In the first eight months of 1950 we sold to Canada chemicals to the value of £2.7 million as compared with £970,000 for the corresponding period in 1949.

While the devalued £ sterling has helped us, we must remember that to get the same amount of dollars an extra volume of 40 per cent of goods is required. The 1950 figures therefore represent about 100 per cent increase in volume over 1949.

What of the future? There has been a gradual extension of liberalisation in the various countries of Western Europe, which means that import licensing will be abolished over a wide field of international trade and that there will remain only tariffs to protect the industries concerned. We may expect to see some tariff reductions as the result of the Torquay talks now in progress, but it is doubtful whether these will be substantial, especially as

America, the prime mover some years ago in urging the reduction of tariffs and trade barriers, has refused to consider any lowering of her very high tariffs over a wide field of organic chemicals, including dyestuffs.

The European Payments Union, which comes into operation on January 1, 1951, should still further widen the field of liberalisation. It should also, we hope, render unnecessary those bilateral trade agreements, with what might be called their detailed shopping lists, found so restrictive of trade in the past. The result of all these activities should be to increase the opportunities for our export trade; at the same time we may expect increased competition both here and overseas, but this should act as a stimulus to our selling efforts.

The rearmament programmes of the Western Allies will influence the size and nature of the demand for our products, and are likely to cause shortages in some of the chemicals required for munitions. Acute shortages have already arisen in certain lines and America is now buying from abroad some products that she was previously selling in her export markets.

There is, however, a longer-term danger to which attention has been drawn in various quarters; it is already causing anxiety in some Western European countries. Several countries are now building up branches of the chemical industry that

they did not possess before. Some of the plans published by the OEEC, if brought to fruition, are likely to result in a productive capacity exceeding any immediately foreseeable demand; dyestuffs are a case in point.

Fears have been expressed that, unless these ambitious schemes for expanding chemical manufacture in Europe are co-ordinated, acute over-production will lead to intense competition that will not be in the best interests of the industry or of those employed in it.

There are many who doubt the ability of the OEEC machine to effect the necessary co-ordination. The problems are of such complexity that they cannot be fully appreciated except by those engaged in the industry. Therefore, just as it is necessary to have a co-ordinated scheme of defence for Western Europe, it would appear desirable to have some similar co-ordination in those industries on which the defence must rely for war materials; I have in mind some simple system by which the industries affected in Western Europe can discuss their common economic problems. Some of the difficulties over the visits of productivity teams to the U.S.A. have now been resolved. A team from the pharmaceutical industry has been accepted and will sail on November 1. We hope that it will be possible to send other teams envisaged and organised.

Amplified Production and a Publicity Plan

THE annual report of the ABCM for the year ended June 30 discusses, *inter alia*, the gradual improvements of the supply position of dyestuffs. It states that a steep rise in the demand for certain individual dyestuffs in the vat, azoic, oil soluble and pigment ranges has contributed to periodic shortages during the year, but the shortages are expected to disappear as new plant comes into operation. A number of dyestuffs not previously available from British makers have been placed on the market, thus making their importation unnecessary.

During 1949 the U.K. dyestuffs industry achieved a record export figure of almost £9 million, and had maintained that rate in the first six months of 1950 without detriment to the needs of home consumers.

Members of the association and of the Association of British Pharmaceutical Industries interested in the production of synthetic organic chemicals that might have properties liable to produce drug addiction, have co-operated with the Home Office and the Medical Research Council in formulating proposals for the voluntary

control of the issue of new products of the kind. Those proposals have been generally accepted and new synthetic drugs of this type will now require the approval of the Home Office before being generally issued to doctors.

The association's publicity committee has investigated very fully the BBC's present programmes dealing with industrial matters and has drawn up suggestions for new broadcast features, to assist the BBC's selection of its winter programmes.

The committee has also prepared and circulated a summary of experience in methods of approach, which should be helpful to member firms seeking the inclusion in BBC programmes of information about matters in which they are interested.

The committee is examining the possibility of preparing a handbook for the BBC and the Press showing the members of the association from whom industrial information on a wide range of chemical subjects can be obtained. It has also considered a number of other matters such as methods of securing editorial publicity in the popular magazine field.

CHEMICAL MANUFACTURERS' DINNER

"Bodies for Motor Cars or Containers for Chemicals?"

THE significance of the fact that Britain was now exporting chemicals to the U.S.A. in appreciable quantities was emphasised by Sir Harry Jephcott, chairman of the Association of British Chemical Manufacturers, at its annual dinner in London on October 11. During the first seven months of this year, he said, Britain's chemical exports to America had risen from the \$4.3 million attained in the corresponding period last year to \$6 million. Our chemical exports to Canada—also dollar exports—had in the same period also risen from \$3.4 million to \$5.2 million. He and the council of the ABCM thought that was a real accomplishment, and they hoped that their friends at the Ministry of Supply and the Board of Trade saw it in the same light.

Sir Harry Jephcott, who was proposing the health of the guests, called attention to the fact that: "If you are to export chemicals you have to put them in something." He recommended that their friends of the Civil Service would have to decide whether they wanted bodies for motor cars or containers for chemicals. Nevertheless, their friends in the Government departments had, he acknowledged, been very helpful and understanding in the way they approached the chemical trade's problems in general and co-operated.

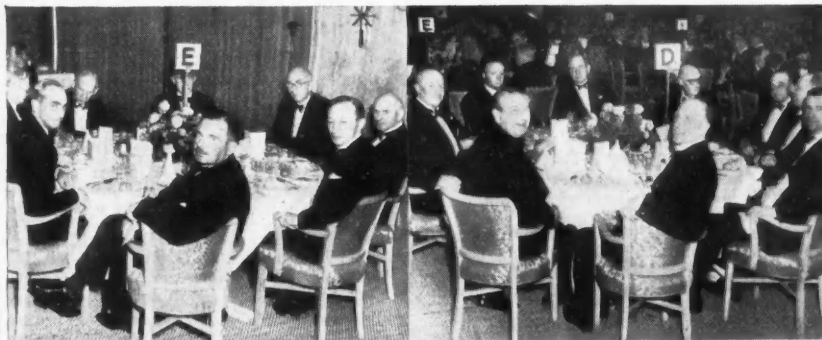
Productivity in the chemical industry

had lately increased quite satisfactorily, and in the early part of this year had been quite remarkable. In their sphere, however, productivity did not depend principally on man-power, as it did in some other industrial spheres; it was a question of rehabilitation of plant and the development of new processes. Both meant capital expenditure. He did not know the extent to which the Government was relying on additional productivity in industry to help the armaments drive, but if calls were to be made on the chemical industry he hoped the Government would not put them in the position of being "the residual legatee" in the matter of capital expenditure.

FBI's Rôle

He gladly acknowledged the happy relationship of the ABCM with its related associations. To one, the Federation of British Industries, whose president was their principal guest that evening, the ABCM and all the other trade and industrial associations willingly paid their allegiance. The FBI was industry's channel of communication in all broad matters of policy between the Government and industry, and it had become of very great importance to all who were concerned with British industry.

When, three years ago, he first became chairman of the ABCM, continued Sir



Dinner parties: With Sir Harry Jephcott (third from right): Sir Robert Sinclair, Sir John Woods, Sir Robert Robinson, Sir Ben Lockspeiser, Mr. W. K. Hutchison, Sir Archibald Rowlands, Professor H. P. Himsworth and Sir William Douglas. Right: With Dr. Lampitt are Mr. C. F. Merriam, Mr. W. A. Damon, Dr. Norman C. Wright, Mr. W. E. O. Walker-Leigh, Dr. E. R. A. Merewether, Dr. H. E. Watts, Professor A. Hadow and Professor E. K. Rideal

Harry Jephcott, he said to himself: "I suppose these trade associations do some good." After three years, he knew that they not only did good, but that their own association was an essential and an integral part of the chemical industry.

Most of their scientific societies had been experiencing difficulties, one of the chief being the high cost of printing and publishing the matters they existed to propagate. As a result of the appeal for funds which had been made in that connection, he was pleased to be able to announce that the Chemical Council was now assured of £30,000 a year for a minimum of three years. £26,000 of that was being provided annually by members of the ABCM. He appealed to all who had not yet responded to that call to do so.

Planning Perils

Sir Robert Sinclair, K.C.B., K.B.E., president of the Federation of British Industries and chairman of the Imperial Tobacco Company (of Great Britain and Ireland), Ltd., responding to the toast, recalled the chairman's reference to the part the FBI played in liaison with the Government departments. That brought him to the subject of "planning"—which he knew none of them liked any more than he did. It was clear, however, that as long as there were currency restrictions and regulations, industry would have to put up with a certain amount of central planning. With them, however, he believed that planning had got to be kept down and that it would be a bad thing for industry if we ever got down to detailed planning. Of some of the recent examples of planning—steel, for instance—industry took a poor view.

Industry's Views

Having apologised for introducing party politics into a social gathering, he observed that as a result of the experience of the last few years many in industry had come to the conclusion that it was of no use presenting industry's views to "our present lords and masters" because industry's views were diametrically opposed to the views of the Government. He did not take that view. "We have got to represent to whatever Government is in power what industry really feels." The feelings of industry were based on good reasoning and good sense, and he was confident that truth and reason would eventually prevail. Views represented to the Government would be listened to so long as they were truly representative of what industry was thinking.

Referring to the Anglo-American Council of Productivity, Sir Robert Sinclair

said that at the time of its inception he and a good many others were filled with considerable misgivings. They saw in it infinite opportunities for the worsening of relations between the two countries. They foresaw the possibility of a sort of detailed American inspection. He was glad that those forebodings had been entirely without foundation. That council was set up with the good will of the Americans and, with a very happy selection of members on the British side, had achieved a very great work. He was concerned that the work of that council should be encouraged in every possible way.

Among the principal guests present were:—

Mr. G. P. Barnett, Chief Inspector of Factories; Prof. G. M. Bennett, Government Chemist; Mr. F. M. Birks, president, Institution of Gas Engineers; Mr. W. A. Damon, Chief Alkali Inspector; Sir Wm. S. Douglas, secretary, Ministry of Health; Dr. W. H. Garrett, chairman, Association of Chemical and Allied Employers; Sir Ian Heilbron, chairman Advisory Council, D.S.I.R.; Sir James R. C. Heilmore, second secretary (home), Board of Trade; Prof. H. P. Himsforth, secretary, Medical Research Council; Sir Norman Kipping, director-general, F.B.I.; Dr. L. H. Lampitt, hon. Foreign Secretary, S.C.I.; Sir Ben Lockspeiser, secretary, D.S.I.R.; Dr. E. R. A. Merewether, chief medical inspector of factories; Prof. D. M. Newitt, president, Institution of Chemical Engineers; Prof. E. K. Rideal, president, Chemical Society; Sir Robert Robinson, president, the Royal Society; Mr. Stanley Robson, president, S.C.I.; Sir Archibald Rowlands, permanent secretary, Ministry of Supply; Dr. H. E. Watts, chief inspector of explosives; Sir John Henry Woods, permanent secretary, Board of Trade.

ABCM Officers

THE election as president for 1950-51 of Mr. L. P. O'Brien, chairman of Laporte Chemicals, Ltd., and of associated companies was announced after the annual general meeting of the Association of British Chemical Manufacturers in London on October 12.

Other officers elected were these:—

Vice-presidents: Dr. F. H. Carr, C.B.E., R. Duncalfe, Dr. E. V. Evans, O.B.E., Dr. P. C. C. Isherwood, O.B.E., Sir Harry Jephcott, C. F. Merriam, M.C.

Elected members:—Chairman, C. G. Hayman; vice-chairman, W. F. Lutyens; hon. treasurer, C. E. Carey; Sir Frederick Bain, M.C., A. D. Daysh, Dr. A. E. Everest, G. E. Howard, L. G. Matthews, T. D. Morson, D. P. C. Neave, F. G. Pentecost, Derek Spence, G. F. Williams, K. H. Wilson, H. Yeoman.

Co-opted members: B. A. Bull and I. V. L. Fergusson.

Honorary vice-presidents: N. N. Holden, Lord McGowan.

Director and secretary: J. Davidson Pratt, C.B.E. Manager, A. J. Holden.

STEEL FOR WELDED PRESSURE VESSELS

Requirements of New BSI Specification

THE 48 specifications for ferrous metals—excluding tubes and pipes used for identical fittings—associated with the new BSI Code (No. 1500) for fusion-welded pressure vessels are to be published as BSS 1501-1506. They will cover all the forms in which steel is used for the construction of pressure vessels—plates, sections, forgings, castings and bars.

Eleven main types of steel in the form of plates are dealt with, ranging from "tank quality" carbon steel for very low pressure vessels to chromium-nickel-molybdenum stainless steels; also 11 types of forgings, 12 types in the form of castings and 16 types of bars for bolting.

All the steels included are required for specific applications, they are produced in significant quantities and, while they represent only a small percentage of the variety of steels theoretically possible or desirable, they cover the bulk of industrial requirements in the pressure vessel field.

This was stated by Mr. J. W. Strawson (Shell Refining and Marketing Co., Ltd.) at the recent meeting in London (THE CHEMICAL AGE, 63, 530) called by the Institution of Chemical Engineers to discuss the new code.

Some of the types of steel were divided into sub-grades, but, even allowing for the sub-division of each of the 11 types of plate steel, only 21 varieties of steel plate were included in the British code, as compared with the 39 varieties and grades included in the ASME boiler code. Mr. Strawson observed that the committee had achieved some measure of rationalisation there. The steel specifications would provide, for the first time in one work, a schedule of British standards for steels suitable for the manufacture of pressure parts.

Printing Delays

It was regretted that bottlenecks in the printing industry had prevented earlier publication of that part of the code, but it was perhaps a tribute to the versatility of BS 1500 that it had, in fact, been possible to administer the code even in the absence of final specifications for the materials, partly, he believed, because many had seen advance copies and were generally acquainted with the requirements.

Publication of those specifications was announced by the BSI in its last monthly information sheet, and copies were likely to be generally available within the next

few weeks. The new material specifications would include the usual low-carbon mild steels which covered the main tonnage demand for steels for pressure vessel construction; a carbon-manganese steel giving a rather higher tensile weldable steel; carbon-molybdenum steels for service at elevated temperatures, particularly in the range 800°-950° F.; a range of chromium-molybdenum steels of increasing chromium content to provide resistance to certain mildly corrosive conditions; and chromium-nickel and chromium-nickel-molybdenum austenitic stainless steels for increasingly severe corrosive environments.

Relation to U.S. Standards

In order to remove any doubt which might exist as to whether a batch of steel supplied to other specifications would meet the requirements of the code, tables were included in BSS 1501-1506 listing the correlation between those specifications and equivalent British and American standards. Those tables should be extremely helpful to manufacturers when they were asked to quote for plant against American drawings which referred to what might be unfamiliar material specifications. The committee regretted that it had not been possible to extend the correlation to include Continental steels.

Most of the properties necessary in a steel which had to operate at sub-atmospheric temperatures had been given a good deal of thought and consideration. It was felt that specifying a minimum impact value of 20 ft. lb. on a standard Izod notched test piece should suffice to ensure that only material with adequate toughness would be used, the test to be made at the service temperature. No attempt had been made to deal with that aspect by specifying restricted chemical compositions, or by making the use of alloying elements obligatory; it was felt to be better done by specifying the mechanical properties required.

The problem was really one for the steel-maker, who could often extend the range of usefulness of the ordinary mild steels simply by the choice of suitable steel-making techniques. Mr. Strawson did not think that steel specifications should, normally, restrict the chemical composition of a steel unless the presence, or absence, of particular elements were essential to the successful performance of the steel in a particular service. The steel-

maker, therefore, was to be left to produce a suitable steel for each particular low temperature application, using the most economical procedure, while the purchaser reserved the Izod test to measure the success of the steelmaker's efforts.

Mr. W. Robson (I.C.I., Ltd.), congratulating the committee on the document, said it was necessarily ambitious and his company intended to use it and encourage its use. He assured the committee that any criticisms he might make would be made in the hope of enabling them to improve it further. Obviously the code had been prepared very largely with a mild steel background; in respect of austenitic steels it was by no means so complete, and information in relation to non-ferrous materials was conspicuously absent. Non-ferrous materials had not been used very widely in pressure vessels yet; many non-ferrous materials were still in their infancy, and quite a number of features about them were still being investigated.

Low Temperature Working

On the mild steel side, Mr. Robson said he would have liked to have seen more definite information concerning vessels to work at sub-zero temperatures within the limits in which mild steel was considered suitable, probably down to about $-30^{\circ}\text{C}.$, and also concerning the temperatures at which the tests on such vessels should be carried out, in order to ensure a uniform quality of material. He felt that the allowable working stresses given were definitely on the high side as regards the austenitic steels. However, in some detailed comments which his organisation would submit, they hoped to say why and to suggest alternatives.

If one were designing a non-ferrous vessel and used some of the methods of construction shown in the code—which in themselves were very suitable for mild steel construction—one might be in trouble. He wondered whether, in view of the paucity of information given, it would not be better, for the present, to leave out of the code the non-ferrous pressure vessel side, so that it would confine itself to steel pressure vessels.

In a reference to the length of the provisional period of the code, Mr. Robson suggested that one year was far too short. Although there were many who had a background on pressure vessels, they had not got it specifically in connection with this code, and he understood that that was what the committee wanted. He recommended strongly that the provisional period be extended for, say, another year. The various concerns interested could immediately submit provisional comments

on the code as it existed at the moment, which comments could be considered by the committee during the next year; then the interested concerns could be asked to submit their final comments at the end of that year.

Other speakers supported Mr. Robson's suggestion to extend the provisional period of the code for another year.

Mr. L. Marsden (I.C.I., Ltd.), referring to the provisions made in the code for safety valves, said his company bought these to a specification for strength. It was a routine matter to try them out under the fluid with which they were to operate, by attempting to release the pressure and then re-seat them. They were lucky nowadays if they could re-seat two or three times; and he had grave doubts about safety valves being used, after once operating, without being taken out and re-conditioned. He suggested the committee might consider the possibility of defining, for chemical plant use, some test for re-seating safety valves prior to delivery.

Mr. J. F. Lancaster (The A.P.V. Co., Ltd.), who said he was concerned with the application of the code to welded vessels in non-ferrous metals, agreed with Mr. Robson's remarks concerning the grave results which could arise from applying some of the welded joint designs that were illustrated in the code to such metals as aluminium and copper. Only too often, he said, draughtsmen attempted to design copper and aluminium vessels as they would design those made of steel and one did not wish to encourage them in that process.

Defects in Aluminium Welds

Some of the requirements for the testing of welds did not apply to aluminium and copper in the same way as to stainless steel. For example, said Mr. Lancaster, there were defects in aluminium welds which were not picked out effectively by radiographic examination, in particular the oxide film inclusions, which could be dangerous. The whole question of weld examination required reconsideration in respect of non-ferrous materials. Underlining Mr. Robson's point, he suggested that pressure vessels in non-ferrous materials should be covered, if possible, by another code, an addendum to BSS 1500.

SIMA's New Headquarters

The Scientific Instrument Manufacturers' Association of Great Britain, Ltd., (SIMA) and the British Scientific Instrument Research Association (BSIRA) announce that their address is now 20 Queen Anne Street, London, W.1. Telephone: LAngham 4251-2.

RESEARCH THEMES AT THE CRL

DSIR Programmes in 1949

CONSERVATION of essential materials, the advancement of separation and purification techniques and the production of fundamental reference data were among the principal pre-occupations of the Chemical Research Laboratory (DSIR) during last year.

The wide programme carried out at Teddington, and elsewhere, in collaboration with research associations and individual firms has been summarised in the current annual report (1948-49) of the Department of Scientific and Industrial Research.

Modernised laboratories and some new equipment, such as a grating spectrometer and an electron diffraction camera have permitted further expansion of the themes for current study by the DSIR chemists.

The laboratory's expansion of precise reference data in the interests of research and analytical chemists and engineers concentrated last year upon the preparation of pure chemical compounds, notably the heterocyclic substances present in coal tar. Now that the required apparatus has been assembled, extension into other fields may be expected.

New Chemicals for Research

This department has undertaken the responsibility of obtaining pure hydrocarbons, to be used for mass spectrometer standards, from the United States, and the subdivision of these bulk samples for distribution to other laboratories in Britain. Furthermore, a scheme for the preparation in the laboratory of research chemicals not made in this country has been prepared. Here again the main emphasis is on purity, and already samples of pure stearic acid and decosane have been supplied to the engineering division of the National Physical Laboratory for lubrication studies.

The laboratory is also collaborating in the inorganic field on the supply of pure metals. Recently a committee was set up to co-ordinate the preparation of pure metals for research and development purposes. The committee has recommended the formation of a stock collection of pure samples of metals not readily available.

The extension of this work is expected to lead to much useful information on the presence and determination of impurities in metals. Comparison of different supplies of a particular element may well result in a raising of the level of purity

generally available, and the existence of a survey, giving complete data on the purity of materials from different sources, should be of considerable value to research.

Striking advances are reported to have been made in the application of chromatography to the separation of inorganic compounds. This new technique involves the use of cellulose, or other absorbent material, and organic solvents which may contain additional reagents. By this means many important separations have been effected. There has been much interest in these developments, which will undoubtedly find applications in analysis and purification of materials.

Among the work done by the laboratory on the utilisation of indigenous raw materials is the examination of flue dust as an important source of gallium and germanium. A considerable quantity of gallium has now been accumulated and samples of the pure metal have been distributed on loan to various research laboratories for study. One interesting property discovered is that its thermal and electrical conductivities vary in a ratio of 1 to 7 according to the orientation of crystal growth.

Canada Intensifies Mineral Research

THE present shortage of industrial minerals required by Canada's rapidly expanding chemical, construction, and manufacturing industries, and the consequent urgent need for research to promote the development of new sources, has required an Industrial Minerals Division to be established in the Mines Branch of the Department of Mines and Technical Surveys. The department receives many calls from industry for work on these minerals and the establishment of the new division will enable it to meet these increasing requirements to better advantage. Mr. M. F. Goudge, who has been in charge of the department's work on industrial minerals for a number of years, will be at the head of the new division. In particular, he will direct the programme of investigation into the processing and utilisation of non-metallic minerals. All the significant mineral resources in Canada have in the past been indexed and the indexing of occurrences of the non-metallic minerals is well advanced.

U.K. POTASH DEPOSITS

140 Years' Supply in Eskdale?

A WORKABLE field of potassium chloride, sufficient to supply the United Kingdom for 140 years, has been proved by borings in one area alone in Eskdale, Yorkshire.

This was stated at a meeting of the Society of Chemical Industry at Newcastle-upon-Tyne on October 17 by Dr. Alexander Fleck, a director of I.C.I., Ltd. Dr. Fleck added that this was the estimated yield from the proved area of only 12 sq. miles. He believed that much more than this existed and there was at least as much potassium in the form of polyhalite which might have industrial potentialities.

Sylvinite, containing mineral potassium chloride, had been discovered at a depth of about 4000 ft.

Dr. Fleck indicated that there were considerable variations both in thickness of the potassium-containing strata and in the content of potassium chloride. By comparison with deposits at present commercially worked in other countries those in Eskdale lay appreciably deeper. There were certainly two workable beds of sylvinite, the easiest of the common potash-bearing ores. Both beds lay nearly horizontal and were not contorted steeply. The upper bed compared well in thickness and potassium chloride content with the average of the commercially worked beds. The potassium chloride content of the lower bed was probably as good as that of any worked bed, and its thickness was only rarely exceeded in any known potash field. I.C.I., Ltd., believed that the proved area alone contained 213.5 million tons.

Dr. Fleck added that the borings had also disclosed a bed of Keupar salt, 100 ft. thick. Of the Eskdale deposits, about 35 per cent would probably be recoverable.

Overseas Trade in September

THE provisional value of U.K. exports in September was £171.4 million, which was £8 million less than the average for the first eight months of the year. This compares with £142 million in September, 1949. Exports to the U.S. in September were provisionally estimated to be £10.4 million, 29 per cent above the average for the first eight months of 1950. Exports to Canada were £10.1 million, £2.1 million lower than in August but slightly above the monthly average for 1950.

PLANT PROTECTION

Expanded Search and Production

THE substantial extensions of the laboratories and technical and production departments of Plant Protection, Ltd., were officially opened at Yalding, Kent, on October 16, by Sir Wallace Akers, director of I.C.I., Ltd., one of the two parent companies by which Plant Protection was created 13 years ago.

Sir Wallace Akers said that from the I.C.I. laboratories some 2000 separate compounds were sent every year to Plant Protection's establishments to see if they were of value to agriculture. It was the Yalding centre's responsibility to see how much could be put into condition for use and to determine how they should be used—as powder, solution, the droplet size, etc.

In the enlarged laboratory block, Plant Protection, Ltd., has a compact unit providing analytical control of its factory, a chemical laboratory for formulation work, a library and a new semi-works-scale laboratory. The operations of the works are mainly the grinding and blending of dusts, the emulsification of liquids and the manufacture of dispersible powders.

World Zinc Control

THE eventual need for international or world control of zinc was foreseen last week by Mr. R. L. Wilcox, chief of the non-ferrous metals branch of the Economic Co-operation Administration. He said, in Washington, that consumption of zinc at the present rate could not be maintained. World production gave a surplus of 54,000 metric tons above consumption, but the 167,000 metric tons estimated to be required by the U.S. Government for reserve would result in a deficit of 113,000 tons.

Solution of these problems, in his view, would seem to lie in control of the metal by a combined materials resources board with absolute control of production.

U.S. Drive for Aluminium

THE United States Munitions Board has asked American producers to draw up plans to expand aluminium production. The Board requires to know to what extent production could be raised by June, 1953, and by June, 1954.

Another branch of the Government, the National Resources Board, has asked producers to specify how long it would take the industry to increase its aluminium capacity by 1 million lb. or 3 million lb.

HEAT AND LIGHT STABILISERS

Main Requirements for the Vinyl Plastics

From A CORRESPONDENT

SUCCESS in the factory processing and fabricating of vinyl plastics, notably polyvinyl chloride, is influenced to a large extent by the efficiency and suitability of the incorporated stabiliser. Its primary function is to neutralise the small amount of hydrogen chloride which is released from the polymer when it is exposed to light and heat, hence the alternative description of "HCl Acceptors." If the stabiliser is not present or present in insufficient quantity there is a strong probability that auto-catalytic decomposition will take place. That is accompanied by a noticeable darkening in colour, embrittlement and eventual disintegration.

A large number of chemical compounds is now being offered to the plastics industry as stabilisers, some of which exercise good lubricating properties. These additives include metallic soaps, such as cadmium, barium and calcium stearates, basic white lead carbonate and phosphate, tin and strontium organo-compounds of unknown composition, and non-metallic organic compounds, particularly certain aryl ethers. The last named are assuming growing importance because of their ability to exert an external plasticising effect on polyvinyl chloride and polyvinylidene chloride.

Physical and Functional Differences

Some of these stabilisers, such as the metallic stearates, are free flowing powders, while others are light viscosity liquids or solvent solutions; e.g., some strontium stabilisers are made up as solutions in a ketone and can be readily used in vinyl solutions for coatings as well as organosols. For many purposes the powder form is preferable as it is mixed easily and thoroughly with the polymer prior to milling.

Choice of stabiliser is influenced by several considerations, some of which relate to processing and others to the heat-sealing and even printing of films: e.g., the presence of metallic fatty acid soaps may present certain difficulties in this regard. Manufacturers of vinyl film for packaging purposes sometimes prefer to use organic tin stabilisers, which are free from fatty acids.

Toxicity and freedom from odour are other important factors which need some thought, particularly for the production of

films and manufactured goods which are to come in contact with the body or with food. Calcium and strontium are safe metals and can be recommended for use where innocuous additives must be employed.

Although the primary function of the stabiliser is to protect the vinyl resin from the damaging effects of light and heat, many stabilisers, especially the metallic soaps, possess good lubricating and release properties. When present in the vinyl compounds to the extent of 2 per cent they are able to promote smooth, rapid extrusion and to minimise the tendency of compounds to adhere to heated calender and mill rolls. It is also claimed that compositions containing metallic soaps show increased resistance to moisture.

Essential Qualities

The main requirements of a good stabiliser can be usefully summarised thus:—

1. It must impart a high degree of protection against deterioration caused by heat built up during processing of the plasticised or unplasticised composition on mixing rolls, calendaring rolls, in extruders and during the actual moulding. Some of the more recent stabilisers, such as cadmium stearate, are able to give a high degree of protection against degradation due to exposure to temperatures of 340° F. for prolonged periods.

2. The stabiliser should possess the ability to protect vinyl compounds from the effects of ultra-violet light. Some of the heat stabilisers in percentages not exceeding 2 are able to give protection for more than 500 hours in a high intensity carbon arc weathering unit. Light stability is of the greatest importance for transparent calendered films finding applications as a textile replacement material and for packaging.

3. The stabiliser must not affect the colour or clarity of the processed vinyl product. This is particularly important with film. Some metallic soaps introduce an objectionable haze into transparent films; lead stearate suffers rather badly from this defect.

4. The additive should contribute to the chemical stability of the vinyl product which is very susceptible to attack by sulphide fumes, etc. Barium stearate is one of the stabilisers now being used to give

added protection to the resin when exposed to hydrogen sulphide.

5. The stabiliser should be in a form that is readily dispersible in common plasticisers. Particle size is important for powders and it is recommended that some 99 per cent of the additive should be able to pass through a 200 mesh screen.

6. Water soluble salts present in the stabiliser should not exceed 0.5 per cent. It is essential that no part of the stabiliser should be leached out of the processed vinyl product when it is exposed to the elements.

7. The chemical inertness of the stabiliser must be of a high order and particular care needs to be taken to ensure that it is not affected by the pigments introduced into the vinyl compound.

8. Toxicity must be low, particularly where the vinyl product is to be used in contact with food. Calcium and strontium stabilisers can be safely recommended for the light stabilisation of transparent packaging films for the food industry.

9. The additive should impart high lubricating and release properties so that all fabricating processes benefit from the

presence of the stabiliser. It can, of course, be argued that separate lubricants are invariably added to the vinyl product, but there is an undoubted advantage in employing dual purpose stabilisers.

10. The price per pound should be low, bearing in mind that appreciable quantities of stabiliser are used in the manufacture of vinyl-wrought products and finished goods.

There is, unfortunately, no such thing as the perfect stabiliser, but there is now available a range of highly efficient compounds which offer several advantages over the early additives, such as lead carbonate and lead stearates.

A good deal of attention is now being given to the claims of mixed stabilisers, such as cadmium-barium stearates.

The degree of stabilisation imparted by a metallic stabiliser is governed by the quantity of solubilised metal which can be introduced into the vinyl composition. It is important that metallic soaps enable compounds to be produced containing different percentages of metal; e.g., with two lead stearates one may be twice as effective as the other because of its higher metal content.

Factors Affecting Solvent Performance

IT has been found that while certain liquids will dissolve bituminous coals of low rank at room temperature, others will not, and that any particular liquid falls into either of these two classes. Chief among the former class, "specific solvents," are the primary aliphatic and certain heterocyclic amines.

Commenting upon work previously published on this subject I. G. C. Dryden of the British Coal Utilisation Research Association, in a communication to *Nature* (166, 422, 561) says that a comparison of solvent power data has now shown that this property bears little relation to the internal pressure, surface tension, dielectric constant or dipole moment of the solvent. The moderate correlation with internal pressure probably reflects conditions under which, because of the incipient pyrolysis of the coal, most liquids are moderately effective "solvents" and specific factors are less important.

At atmospheric pressure, on the contrary, the following rules have emerged. A specific solvent (for example, an aliphatic primary amine) contains a nitrogen or oxygen atom with an unshared pair of electrons which, however, may be prevented from promoting solvent power by (1) excessive hydrogen bonding, e.g., in amines diluted with water, or in ethylene

glycol as contrasted with ethylene diamine; and (2) by participation of the lone pair in resonance of the molecular nucleus, e.g., in aniline and pyrole as contrasted with benzylamine and pyridine. Nitrogen compounds are generally better solvents than those compounds containing oxygen (compare primary amines with alcohols, which are very weak in solvent power).

Alkyl groups tend to reduce solvent power: diethylamine is one of the most effective precipitants for removing coal extracts from solution in specific solvents, and is an important factor determining the lack of solvent power of secondary and tertiary aliphatic amines. Solvent power is further modified by molecular size, viscosity and by inductive effects which influence the availability of the unshared pair.

The heat of interaction of various amines with aluminium chloride has recently been used as an approximate measure of the co-ordinate bond-energy. Amines fall into the same relative order as that found when they are arranged according to their ability to swell and dissolve lower-rank bituminous coals, thus further confirming the conclusion that an electron-donor mechanism is concerned in the interaction between these coals and amines.

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MEMBRANE PERMEABILITY

Investigation by Three Methods*

THE membranes surrounding living cells are capable of maintaining a difference in osmotic pressure between the two sides. Living cells are in dynamic equilibrium and alteration of the rate processes may cause changes in the membrane, affecting its permeability.

Membranes may be formed by the operation of surface tension forces alone. Natural membranes of animal origin, contain proteins and lipoids, the bacteria, mucoids, and magnesium ribonucleate and the plants cellulose. The physiologist attempts to explore the nature of natural membranes *in vivo*, while the physico-chemical approach is to make models and find which model behaves most naturally. The monolayer technique reveals that membranes behaving as osmotic barriers must be multimolecular in thickness.

Three different types of membranes are recognised; the so-called sieve or capillary membrane, the liquid or oil membrane, and the membrane consisting of a polymer.

The problem of permeability has been attacked both by direct passage, by osmotic and by emf methods. Each has contributed some information of value. Capillary membranes may consist of relatively large pores, as in aggregations of particles of different sizes of laminar sheets, as in charcoal, or even of molecular pores, and as in the zeolites.

Tortuosity Factor

Our interest is in the tube areas and lengths. The latter involves a tortuosity factor. The Kozeny-Carman treatment of void fraction and surface area neglects in vapours the surface flow along the capillaries; and in liquid absorption, application of the Kelvin equation leads to the assumption of an immobile adsorbed layer of liquid. The work of Michaelis on the emf across sieve membranes has been reinterpreted by Meyer and Teorell in terms of two Donnan restraints on each side of the membrane and a number of fixed charges inside the membrane.

The permeability constant P , i.e., the number of c.c. at normal pressure and temperature of gas passing through a square cm. and a thickness of 1 mm. in one second is the product of the diffusion constant D

and the solubility constant S . The former may vary as the membrane concentration of dissolved vapour changes.

The permeability of polymer membranes is determined by the number of Eyring holes in the membrane capable of holding molecules of the penetrant, and the movement through the membrane is determined by the microbrownian movement of the non-crystalline chain segments of the polymer.

Movement

Movement is thus a property of the polymer; the permeation process requires an energy of activation and is not a free diffusion; solute molecules suffer a large change in entropy when "dissolved" in a polymer, i.e., are rather tightly held; the microbrownian movement of the chain segments likewise involves consideration of the ratio of fringe to micelle in the "fringed micelle" type of polymer.

Some penetrants can peptise the micelles, others cannot do so. If such a polymer membrane is expanded by solvent or plasticiser it passes over into the capillary type, which has already been discussed.

The oil type of membrane seems to bear the closest analogy to natural membranes which may consist of a lipid-like material held in an open network of cellulose, or in the form of a lipid lipo-protein complex mosaic.

The reactions at the interface between the membrane boundaries and the homogeneous phases can be studied by the monolayer technique. Here the control of the mechanism of chemical reactions by surface tension changes, as well as the phenomenon of penetration, is all-important.

FACTORS IN SOLVENT PERFORMANCE

(continued from previous page)

Particularly striking is the great difference between primary, secondary and tertiary aliphatic amines observed in the case of their interaction with tributyl boron.

The observations with coal therefore indicate that the electron acceptor on coal surfaces is surrounded by alkyl or other groups projecting from the surface. Inertness of secondary and tertiary aliphatic amines was observed only when butyl groups were attached to the boron.

* Abstract of Professor Rideal's Procter Memorial Lecture at the annual conference of the Society of Leather Trades' Chemists during September 22-23, at the University, Leeds.

IDENTIFYING VEGETABLE OILS

Effective German Alkali Isomer Test

RICINENE oil, obtained by dehydrating castor oil and sold under various trade names, has become a valuable addition to linseed and wood oils in the manufacture of paints, varnishes, and alkyd resins. Originally it was obtained by the Scheiber method, using free fatty acids, but nowadays it is more often produced by dehydrating castor oil direct with catalysts. Formerly, it could easily be identified by its chemical constants, e.g., diene number (20) and iodine number (about 155) so that it was not liable to be confused with natural drying oils.

Specific Test

Since the introduction as paint oils of many similar processed materials a specific test for ricinene oil has become essential. Dr. J. D. von Mikusch has recently described such a test. (*Farben, Lacke, Anstrichstoffe*, 1950, 4 (9), 337-8 Sept.).

Ricinene oils obtained by the usual methods in most cases still have marked optical rotation, namely, dextro of 2-7°; but their distilled fatty acids may have no such rotation. Since some natural oils, such as sesame, may be also dextro-rotatory this cannot serve as an indicator for ricinene oil. It is possible, however, to distinguish dehydrated castor oil from similar products by its content of linoleic acid isomers and its consequent behaviour in alkaline isomerisation.

Theoretical considerations and experimental work led to the conclusion that, in the dehydration of castor oil four isomeric octadecadienic acids may be formed, of which two have their conjugated double bonds in the conjugated (9,11) position and two in the isolated position (9,12). Of the latter one, the *cis, cis*-compound, is identical with natural linoleic acid, while the other is the 9,12 *trans*-octadecadienic acid not found in nature. Similarly the 9,11-octadecadienic acid of ricinene oil may have both the *cis, cis*- and the *cis, trans*-configuration.

It would appear from this that the *cis*-double bond of ricinoleic acid is not elaidinised during dehydration. That this assumption is normally correct is apparent from the differing behaviours of ricinoleic and ricinelaidinic acids in dehydration. Only from the latter is formed the Mangold (trans, trans) 9,11-linoleic acid of m.p. 54° C.

In examining the natural oils containing

linoleic acid the usual (*cis, cis*) linoleic conjugated product of relatively low m.p. is obtained by alkali isomerisation. Treatment of the *cis, trans*-linoleic acid with excess alkali, however, yields a high-melting point (trans, trans) 10,12-linoleic acid, which may easily be separated from the other isomerisation products. Properties of this acid have been previously described by von Mikusch.

The differing behaviour of the two linoleic isomers has enabled a simple method to be developed for identifying dehydrated castor oil. For this the fatty acids (soluble in petroleum ether) obtained from the oil to be tested—or from an alkyd resin—were first freed from solid fatty acids by cooling to -40° C. in methanol solution. Of the remaining liquid acids, 2g. were topped up to a volume of 20 c.c. with a solution obtained by heating 20 g. NaOH with 100 c.c. diethylene glycol to about 205° C. This mixture was heated over the oil-bath at 200° C. for about 20 minutes, during which hydrogen or nitrogen was passed through it.

During the first five minutes required to reach the reaction temperature the mixture was stirred to obtain a homogeneous soap solution. The soap was acid-split in the usual manner and the fatty acids obtained were treated with petroleum ether, washed, and dried. A methanol solution of the fatty acids freed from petroleum ether under carbon dioxide or *in vacuo* formed on cooling to -40° C. crystals of 10,12-octadecadienic acid of about 20 per cent yield. This depends upon the presence of dehydrated castor oil in the original material.

Melting Point

After once recrystallising, a melting point of over 50° C. is usually observed, and in doubtful cases identity may be confirmed by determining the mix melting point with pure 10,12-acid. Another characteristic is the increase in the refractive index through isomerisation. Pure 10,12-octadecadienic acid had n_D^{20} of 1.4692. Tests of various oils by this method gave the following results:

1. Commercial dehydrated castor oil, including samples obtained catalytically in the laboratory, the liquid fatty acids constituting about 96-98 per cent of total acids, showed an increase in refractive index—when isomerised—between 0.0034 and

0.0048, or 18-22 per cent. After once recrystallising the m.p. was between 49 and 53° C. Tests of the mix m.p. with purified 10,12-acid were in all cases positive.

2. In oils of high linoleic acid content, such as sesame, poppyseed, tobacco seed, maize germ and soya bean oils, the liquid fatty acids constituted from 55 to 85 per cent of total acids, and showed an increase in refractive index of 0.0053 to 0.009. In no case was a solid isomerisation product obtained on cooling in methanol solution.

3. Conjugated oils of commercial and laboratory types in most cases showed no increase in refractive index in the alkali treatment, but rather a slight decrease. The increase noted in one case was doubtless the result of incomplete conjugation of the commercial product. No solid isomerisation products were obtained in the given conditions.

4. Oils of high linolenic acid content, linseed oil, etc., showed a marked rise in refractive index. In some instances there was formed a small amount of solid isomerisation products which had a higher refractive index to the extent of 0.0150 units than the solid acids of ricinene oil, and could be easily identified as pseudo-

elaostearic acid. The triple-conjugated unsaturated acids from linolenic acid could therefore hardly be confused with the 10,12-octadecadienic acid.

5. Natural conjugated unsaturated oils, wood oil and one or two others, exhibit no rise in refractive index through isomerisation. They may be distinguished even in mixtures with other natural oils by the higher refractive index of the solid fatty acids separating out in the first stages (elaostearic acid). Solid isomerisation products are not formed in the treatment of such oils or their mixtures with other natural oils.

6. Other oils, i.e., castor oil, showed a slight decline in refractive index; tall oil fatty acids an increase; no solid isomerisation products were formed.

7. Ricinene oil in a mixture comprising 25 per cent dehydrated castor oil with linseed oil, yielded a positive result; a 10 per cent content could not be definitely detected.

In all these cases except the last this method furnishes a definite means of identifying oils, fatty acids, or alkyls of the varied commercial unsaturated types. A further supplementary test is needed to identify ricinene oil in mixtures.

Oil Mill Refining Wastes

Useful Aspects of French Research

MUCH interesting research in recent years has been directed to the study and utilisation of oil mill refinery wastes. M. Pierre Mérat, Secretary General of the ITERG (Inst. Tech. d'Etude et de Recherches des Corps Gras) has described some of this work, including that undertaken at his own Institute (*Oléagineux* 1950, 5 (7), 407-414).

Attention is given first mainly to the mucilaginous matter or phosphatides, particularly lecithins, and the work of Desnuelle and collaborators at the ITERG, of which a detailed account has been published (*Ann. Nutrit. et Aliment'n.* 1949, 3 (3-4) 367-379).

It may be recalled that the phosphatides can be considered as triglycerides in which a fatty acid radical is replaced by phosphoric acid. In the lecithins the phosphoric acid is esterified by choline; and in the cephalins it is re-esterified by colamine or hydroxyethylamine. The two series of derivatives are distinguished by their differences of solubility in alcohol.

The lecithins are recovered mainly by centrifuging—after flocculation and removal of the aqueous layer—and may be

subsequently further treated with acetone for removal of glycerides, fatty acids and possible impurities.

M. Mérat says that in France the oil-milling industry is not yet properly equipped for the latter type of work, which greatly improves the organoleptic and keeping qualities of the lecithins. This is of greater importance now that they are being increasingly used in food technology.

The free fatty acid content of crude oils and fats varies within very wide limits, the maximum of about 60 per cent being found in palm oils produced by primitive native methods in W. Africa. The best known methods of removal are neutralising or saponifying with alkaline lye, and by superheated steam under reduced pressure. The soaps (soap-stock) formed by the first method may be sold to the soap-makers as such or split with sulphuric acid to recover the fatty acids. The product is very impure and still contains appreciable amounts of more or less neutral oil.

Steam treatment is often preferred,

though the alkali method with recent improvements is still largely used, e.g., the Bamag-Vecer process. The industrial uses of fatty acids are many and varied and have been voluminously dealt with in the literature.

Colouring matters in oils and fats (carotenoids), except in palm oil, are generally eliminated in the process of bleaching and recovery is not usually considered worthwhile. In plants as a whole these carotenoids comprise lycopene and carotene. The former is responsible for the red colour of tomatoes and the hips and haws of English hedges; while the latter, isomeric with lycopene, has four homologues: alpha-, beta-, gamma-, and crypto-xanthine. The beta-carotene may be divided into two molecules of vitamin A, and the name provitamin A has been assigned to it.

Palm Oil Fractions

Some interesting work with palm oil has been carried out by the IRHO (Inst. de Recherches pour les Huiles et Oléagineux) by M. Loury and co-workers (Value of palm oil as food, *Ann. Nutrit. et Aliment.* n., 1949, 3, (3,4) 451-458). They found that palm oil, after neutralisation, could be easily separated into two fractions. One fraction is solid and slightly coloured, consisting chiefly of saturated glycerides, and represents about two-thirds of the original oil. The other is liquid, consisting mainly of unsaturated glycerides and most of the colouring matter, and is usually known as red palm oil.

For recovery of carotene from the latter mixture the IRHO used two methods—distillation and saponification. In both cases the first step is the preparation of methyl esters; then (a) distilling under very high vacuum (1/10 mm. Hg.) at a temperature of 130-140° C., and recovering the carotenoids by chromatography; or (b) saponifying at a temperature of 60° C. or below in a nitrogen atmosphere, and treating the resulting dry soap mass with a solvent—petroleum ether, acetone, or chlorinated medium.

Method (b) is said to be a considerable improvement on those used hitherto. Saponification is limited to the coloured liquid part of the oil, and there is economy both of solvent and apparatus. The soaps form a useful by-product—sodium oleate with 25-30 per cent palmitate.

These carotene extracts should prove of great value in animal nutrition. They are odourless and tasteless and sufficiently stable, as they retain all the natural antioxidants of palm oil.

The sterols are characteristic con-

stituents of all oils and fats, and usually form the greater part of the unsaponifiable portion; that of animal fats is mostly cholesterol, while the complex mixtures in plants are as phytosterols. Two of these have been definitely formulated, e.g., sitosterol ($C_{27}H_{48}O$) and stigmasterol ($C_{28}H_{48}O$). The sterol content in oils varies widely; from 0.3-0.4 per cent in linseed or colza oils to 3.5 per cent in cottonseed oil, and over 7 per cent in some fish liver oils.

Sterols have become important sources of sex hormones, vitamin D, and other pharmaceutical products. The odorous substances in oils and fats removed in the superheated steam treatment often have a fairly high ketone content, e.g., methyl-nonylketone. There is a possibility that these substances may be of value in perfumery. (See also paper by Jaspersion & Jones (*J.S.C.I.* 1949).

In the second part of his work the author deals with oil-cakes and constituent products—proteins, lipids, glucids, mineral salts, and vitamins. The cake may be roughly classified as alimentary and industrial. To the former class belong the well-known cattle foods that have been fairly comprehensively dealt with in the literature. Recently they have formed the subject of a monograph compiled by the ITERG, which is, however, not for publication.

Valuable Protein

Increasing commercial use is being made of the cake, etc., obtained from pressing or solvent extraction methods (from solvent extraction the product is usually first in the form of meal). This cake is of doubtful value for cattle, and possibly toxic, but in a similar fashion to alimentary cakes it is used, for example, in the production of synthetic fibre (Ardil, etc.). The protein content is of major importance. It may be classified in two main categories: simple and conjugated. To the former belong the albumins, globulins, prolamines and glutelins; while the conjugated proteins are combined with other compounds such as carbohydrates, nucleic acids, etc.

Industrial applications may be divided into four groups, according to the extent of the change in the protein molecule: (a) very rare, in which the molecule size is unaltered; (b) chemical treatment to increase size of molecule; (c) partial degradation of the protein; and (d) complete hydrolysis into amino acids. Uses in production of adhesives, plastics, synthetic fibres (Ford Motors and I.C.I.), in the paper industry, and miscellaneous are briefly described. (25 refs.).

Technical Publications

DESIRABLE characteristics of the sensitive materials used, and recommendations on their handling and processing, are set out in "Photographic Aspects of the Radiography of Welded High Pressure Vessels," by L. Mullins. This reprint from "Welding Research" (Vol. 1, No. 4) is now available from the British Welding Research Association as a booklet (T.25) illustrated by 23 plates and diagrams.

* * *

INDUSTRIAL applications of the M-V tubular-sheathed heating element are described in an illustrated publication (No. 7703/1) recently issued by the Metropolitan-Vickers Electrical Co., Ltd., Manchester. A particularly interesting use is the emission of infra-red radiation. Other applications are in connection with convection heating, metal heating, cadmium and other plating baths, bitumen compounds, drying cabinets, pressure vessels and vacuum chambers.

* * *

THE rapid growth of chemical industry owes much to the process of welding and to the contractors who are producing a wide range of structures, vessels and equipment of varying metals to satisfy its requirements. Examples of the versatility of welding applications are given in a generously illustrated article in "The Welder" (Vol. 29, No. 104) published by Murex Welding Processes, Ltd. Among the plants described are those of the carbon black project carried out for Cabot Carbon, Ltd., Ellesmere Port, Cheshire, and the 130 ft. welded stack for Monsanto Chemicals, Ltd.

* * *

BIOS Survey No. 31 "Packaging in Germany during the period 1939-1945" (HMSO, 2s. 2d. post paid) surveys fields of German wartime packaging covered by reports previously issued (BIOS, etc.). Much of the information now collated is hidden in reports on other subjects, and there are comparatively few reports which deal with packaging as such.

There are notable gaps in the subjects included in the survey; no useful information has come to light on any type of wooden container. The survey contains nine sections covering: Paper, board, parchment, films and foils; metal containers; plastics; glass; textiles; adhesives and adhesive tapes; rot- and fire-proofing and corrosion prevention; food packaging; and filling machinery. Each has been prepared by an expert.

TETRA-ETHYL LEAD, the main stages in one manufacturing method and its applications are described in the current issue of "The Shell Magazine," (Vol. XXX), by K. F. Lindley, who also describes the early investigations of Thomas Midgley and Dr. Wilson.

* * *

A WIDE range of products, from bone meals and fertilisers to aluminium and non-ferrous castings, fire pumps, plastic moulds, pharmaceuticals, welding, etc., are listed in the third edition of the "Directory of Coventry." The book contains useful information about the city of Coventry, Government and public offices, trade inquiry offices, etc.

* * *

CREEP, one of the most interesting phenomena of the deformation of metals, is dealt with in a detailed and lavishly illustrated article which appears in the October issue of *Endeavour* (9, 36, 165 *et seq.*) The author is Professor E. N. da C. Andrade, director in the Royal Institution of Great Britain.

* * *

VIBRATION problems are the subject of special articles in the current issue of "Torque" (Vol. 1, No. 6), development journal of Silentbloc, Ltd., and the Andre Rubber Co., Ltd. Apparatus for record vibration tests in automobiles is described by Rolt Hammond, and in the first of a series of articles J. H. A. Crockett deals with industrial ground vibrations.

* * *

A COMPACT and precise instrument for the rapid routine measurement of fine suspensions and colour in liquids is being manufactured for Filtrators, Ltd., by the Edison Swan Electric Co., Ltd. The two companies collaborated in its design and development. The principle involved in the Filtrol photo-electric absorptiometer (governed by Beer's and Lambert's laws) is a precise measurement by photo-electric means of the light absorbed by liquids. The instrument, described in a leaflet just issued, can be connected to any 200-250 volt A.C. mains supply. Two identical glass cylinders of liquid, the reference and test samples are placed in the vertical tubes of the carrier and are in turn moved to a position between the light source and the photo-electric cell. Each tube can easily be moved to the correct position beneath the light source and measurement is facilitated by four interchangeable colour filters.



The Chemist's Bookshelf

NEW ATOMS. Otto Hahn. 1950. London, New York, Amsterdam and Brussels. Elsevier Publishing Co., Inc. Pp. 184. 12s. 6d.

Transmutation of the elements and atomic energy are topics about which little was written before 1945, and of the little there was practically nothing which the ordinary person could be expected fully to understand. Since 1945, however, there has been a spate of "popular" books on these and allied topics, the most recent of which fails to fulfil the promise implicit in the identity of the author. On the dust cover are posed certain questions, the implication being that the answers will be found in the text. The publishers' note asks: "How did Professor Hahn make the discovery, so potent for possible good and certain evil? Why did the Nazis make so little use of it? What are the elements we can now make, and what are their potentialities for the future? Why is the hydrogen bomb so much more disastrous a prospect than even Bikini could hold out?"

Those questions, to which everyone would like to have Professor Hahn's answers, are in fact largely evaded by the ambiguities and obscurities of the text, which occasional misprints, grammatical errors and the like serve to heighten. This small and relatively expensive book, in fact, skates over the more burning aspects of the subject and is little better than a rather perfunctory summary of the work done in this field, together with a little of the fundamental theory underlying the "making" of new atoms.

It is also difficult to assess the amount of previous knowledge required for the comfortable reading of this book, which is supposed to be suitable for popular consumption. For example, on page 13 reactions involving γ -rays are mentioned several times, but the reader is not told what γ -rays are. A simple definition of such terms would seem to be essential in a work intended for the lay reader; failing that, a glossary should be appended. This book offers neither.

The last part of the book, which deals with Professor Hahn's reminiscences, is by far the best. It is most interesting and takes the reader "behind the scenes." For

the remainder, greater care in presentation, clearer English and a less jerky style, would have considerably improved the work, and perhaps made it worthy of so distinguished a scientist as Professor Hahn.—P.M.

Books Received

GERMAN - ENGLISH DICTIONARY FOR CHEMISTS. A. M. Patterson. 1950: New York, John Wiley & Sons, Inc. London: Chapman & Hall, Ltd. Pp. xviii + 541. 40s.

TITANIUM. Jelks Barkdale. 1949: New York, The Ronald Press Company. Pp. xii + 591. \$10.

STRUCTURAL CHEMISTRY OF INORGANIC COMPOUNDS, Volume 1. W. Hüchel. 1950, London, Amsterdam and New York: Elsevier Publishing Co., Ltd. Pp. xi + 437. 70s.

SELENIUM. S. F. Trelease and O. A. Beath. 1949, New York. Published by the authors. Pp. vii + 292.

UNFAMILIAR OXIDATION STATES AND THEIR STABILISATION. J. Kleinburg. April, 1950: University of Kansas Press. Pp. 131. \$3.

British Instruments Exhibition

A REPRESENTATIVE display of British scientific instruments will be made in London next year—from July 4-14. The British Instrument Industries' Exhibition is expected to bring together nearly all types of industrial and scientific instruments, and considerable support has already been evidenced by the applications for space received from trade associations and their member firms. These include the Scientific Instrument Manufacturers' Association, British Industrial Measuring and Control Apparatus Manufacturers' Association, British Electrical and Allied Manufacturers' Association, Drawing Office Material Manufacturers' and Dealers' Association, British Lamphown Scientific Glassware Manufacturers' Association and the Department of Scientific and Industrial Research.

OVERSEAS CHEMISTRY AND INDUSTRY

ADVANCED ENGINEERING IN HUNGARY

Current Work on Special Autoclaves

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THE contrast represented by the comparatively advanced stage of technology in territories which before the war were among the "industrially backward" countries is underlined in current news of industrial development in Hungary.

The Lampart Company has for a considerable time been specialising in the manufacture of enamelled, acid-resistant apparatus, mainly for the chemical industry. The synthesis of organic chemicals is now calling for much special equipment for the new techniques.

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An account contributed by Péter Farkas to *Hungarian Heavy Industries* (No. 3) throws interesting light on the degree of development of chemical plant designing and construction in post-war Hungary. The author is chief engineer of the Lampart Works. He gives several examples of the kind of problems dealt with.

So far, the majority of experiments have been carried on in special laboratory glass apparatus. By employing greater pressures and higher temperatures, the chemist can prepare his compounds more quickly and, more important, by using these techniques can open up the road to new achievements.

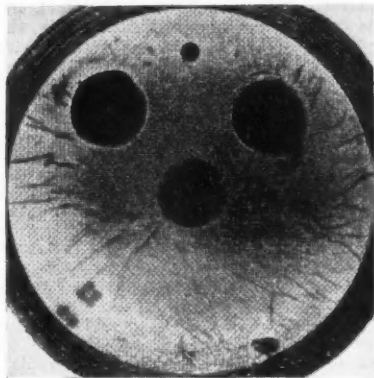
Glass Apparatus Unsuitable

Chemical reactions under higher pressures and greater heat than previously used will yield a great number of useful compounds. For these tasks, however, glass apparatus was no longer suitable and special equipment was required. Research to develop new types of chemical apparatus has been carried on by the I.G.F. and Andreas Hofer in Germany, and also in the U.S.A.

As a result of widespread experiments several types of workable high-pressure autoclaves have been developed which meet the requirements of the chemical industry. The basic problems having been solved, new designs have only to cope with the special demands of individual processes.

The Lampart Works received requests from various Hungarian research laboratories for the designing of high-pressure autoclaves, and, after more research, began to produce special autoclaves.

Autoclaves are chosen for the kind of chemical reactions intended for observation. The reactions between solid, liquid and gaseous materials are of different kinds and it is at the chemist's discretion



Effect of pressure on autoclave

to select the apparatus which will best suit his purposes. When the methods have not yet been worked out and experiments are necessary, small-sized, high-pressure bombs are recommended as the most suitable for deciding upon the principles of procedure.

These bombs are made with a maximum capacity of 50 cu. cm. for highest pressures of 500 atm. and a temperature limit of 500° C. They are made of material which is heat and acid resistant stainless steel. Smaller bombs are made only with pyrometers, larger ones can also be equipped with manometers and valves. They are heated with gas flame, oil- or salt-bath. To avoid eventual over-pressure, account should be taken of the superheated steam pressure, which can be calculated easily from the heat value, or the course of the chemical reaction has to be assessed in advance.

In experimenting with the bomb all calculations were checked by exposing the various parts to very high pressures. The result of one of these experiments is shown in the photograph above.

A 500 c.c. capacity pure nickel autoclave was exposed to 150 atm. pressure and 300° C. heat and in the hollow space of the cover stuffing box a pressure of 10,000 kg/sq. cm. was created. The picture shows the effects of this excessive pressure upon the metal. No explosion took place,

only radial cracks developed—along the crystalline boundaries.

This excessive pressure—brought about on a hydraulic press by means of a plastic medium—has proved that the apparatus was constructed with an ample safety margin. Moreover, the carefully selected materials do not explode but instead develop minute cracks through which the pressure discharges. With normal use, the apparatus offers a 100 per cent service safety with the additional assurance that occasional excesses of pressure can be periodically withstood.

Autoclaves are destined generally for slow reactions. As a rule, the useful charge must not be more than two-thirds of the entire capacity. Standing autoclaves are used when there is no need for keeping liquids in motion, but for mixing of gases with liquids, as well as for mixing of difficultly miscible liquids, shaking autoclaves are installed. These types are also used for carrying out tasks in which oxygen is involved.

Shaking autoclaves can be employed for hydrating and here a permanent gas supply is maintained by means of a capillary. Autoclaves with agitators, both vertical and horizontal types, are used when the reactor has later to be carried out on a factory scale. The choice between

them depends on which affords the best means of accelerating the reaction. When a large surface contact between the gas and liquid is required, the horizontal type is chosen; whereas if the gas is required to pass continuously through the liquid in the presence of a catalyst, the vertical type is used.

As an example of the use of specially designed autoclaves the case of a prominent Hungarian pharmaceutical factory is mentioned. The factory set up a programme to develop an anti-TB compound, but the chemists were unable to put their ideas into effect for want of suitable equipment. After the research chemists had heard about the capacities of the Lampart apparatus the factory was commissioned to begin constructing the new autoclave without delay. After six weeks the work was successfully completed and the autoclave was delivered. It was an agitator type with a special heatkeeping, dry stuffing box suitable for the special requirements.

Thus, equipped with the new autoclave, the research staff of the pharmaceutical factory put their ideas to test, and, as their findings were confirmed, the manufacturing process of the new drug was developed.

Current Research and Production in India

THE National Metallurgical Laboratory of India, which is being built at Jamshedpur, is nearing completion and is expected to be formally opened on November 16 by the Prime Minister, Pandit Nehru. The new laboratory is one in the chain of 11 National Laboratories being set up by the Government of India at different places in the country. Seven of these will be ready this year, including the Central Food Technological Research Laboratory in Mysore, which will be opened on October 21, and the Central Drug Research Institute of Lucknow, which will also operate before the end of this year. The remaining four will be opened during 1951.

Arrangements are being made for the manufacture in India of Antigen, required for the treatment of venereal diseases. Announcing this, Mr. T. G. Davies, Chief of Mission (India, Afghanistan and Ceylon) of the United Nations International Children's Emergency Fund, said that production would be started with the help of the World Health Organisation. The "know how" will also be made available to India.

The Government of India is to conduct

a survey of the scope for the growing of pyrethrum in the Nilgris and the Palni hills in Madras State, and in Kashmir and Assam. The Madras Government is likely to employ Government of India officers to conduct the survey. During the last war 1800 acres of pyrethrum was grown on the Nilgris and about 600 acres on the Palnis. It was also grown in Kashmir and to a small extent in Assam. After the war the demand for pyrethrum fell and its cultivation was restricted. Now the yield in Madras State is utilised for making pyrethrin for use in the Forest Department and in Government offices. The prospect gains encouragement from the restriction of the use of DDT for some purposes in the U.S.A. Pyrethrum has virtually no toxic effect on human and cattle life.

Kenya, the chief supplier, is unable to meet the whole of the current demand. In 1944 a total of 34.5 tons of dry flowers was collected in the Nilgris and in the Palnis, and 97.9 tons in 1945. In 1946 there was a sharp reduction, only 21 tons being collected.

PLASTICS IN WESTERN GERMANY

Overall Shortage of Raw Materials

ALTHOUGH world economic conditions and, in particular, the international situation, have during the past few months led to an increased demand for plastic products, Germany, because of the lack of certain raw materials, has been unable to take full advantage of this rising demand.

Among the reasons for this given by Dipl. Ing. H. Tschischer, director of the Plastics Trade Association (*Chem. Industrie*, 1950, 2 (10), 495-9) is the current shortage of phenol, for which the demand in Germany has approximately doubled since the end of 1949. This demand has outweighed production from tar distillation although this increased from 1970 tons in 1949 to 6600 tons this year, and has also outstripped production from synthesis methods (now 12,000 tons per annum). The latter are hampered by a scarcity of benzol.

Benzol output in W. Germany is now about 22,000 tons per month, 10 per cent higher than in 1949, but still 20 per cent below the pre-war output. The demand for benzol as a fuel, which is now about 250,000 tons a year, leaves only 14,000 tons for other industries, including plastics.

The importation of benzol and phenol is practically impossible especially from the U.S.A., where benzol is the main raw material for styrol and thus for Buna-S.

Better Styrene Supplies

Phenol-cresol mixtures may, however, ease the benzol scarcity in Germany. The supply of styrene is little better. Total capacity of East and West Germany was originally limited by the Allied authorities to 20,000 tons but the Russians seem to have waived this rule, and the 20,000 ton limit now applies only to W. Germany. Yet present production of styrene and polystyrene is insufficient, and contracts for supplies from America have had to be cancelled because of long-term delivery dates—up to 18 months. The position would be worsened if Buna manufacture should be resumed to any appreciable extent in W. Germany, although at present this seems unlikely. Polyvinylchloride is also increasingly in demand, e.g., by rubber interests. Productive capacity in Germany, however, has suffered seriously from demolitions and is at present only 1200 tons of PVC per month in West Germany, while the demand would require at least 1800-2000 tons. A certain amount has to be exported.

The important material, polyethylene, is in growing demand, particularly for electrical and chemical engineering. A relatively new field for this thermoplastic is the manufacture of acid containers—for which there is said to be a large future. Within the next few years demand for polyethylene in West Germany is likely to be approximately 10,000 tons per annum. Thus, it is not surprising that the prices of raw materials for plastics industries have soared. This applies not only to those already mentioned but also to casein, linters and other cellulose products, linseed oil, etc.

The author does not think the position is likely to improve in the near future. He especially mentions the import of linseed oil from Brazil and Uruguay to the value of \$17.5 million and says that this shows the marked tendency for prices to increase.

Manufactured Products

In the same issue of *Chemische Industrie* is an article by Dr. G. Suhle, director of the GKV (Gesamtverband Kunststoffverarbeitende Ind.), who describes the present general position of the manufactured plastics industry. A rough estimate of the number of firms engaged directly or indirectly in the various branches of the industry is 7500 to 8000 in West Germany, but only about 1200 of these are wholly engaged in genuine plastics manufacture. These firms employ about 29,000 persons, of whom nearly 5000 are employers, directors, or managers. Without increasing works or plant capacity the number could be raised to 40,000 by introducing shift working on a larger scale. The limit is not demand, for in the export field at least, this is increasing, but is instead the raw materials scarcity already mentioned.

West German production returns are not available, but for the British section, which represents 60 per cent of the total, the monthly output in 1949 averaged 1750 tons. This rose during the first half of 1950 to 1800-2000 tons per month, and shows a fairly uniform rate of increase from January, 1947 (323.7 tons). The estimated production in all West Germany at present is 3765 tons per month, with a value of Dm.24.9 million. This presumably refers to manufactured plastic products, in which moulded products (pressmasse)

(continued at foot of next page)

Rising Cost of South African Chemicals

Reported Difficulties of Using Industries

SOUTH AFRICA is experiencing an acute shortage of some industrial chemicals. This has been attributed largely to the effects of the Korean War and of rearmament schemes. Chemicals imported from the Far East, particularly, are coming in more slowly and have risen considerably in price. Prices of several chemicals from the United States and Britain have also risen and deliveries are falling far short of the Union's demands. One cause of the scarcity of imported industrial chemicals is the world shortage of steel, tinplate and tin, which are necessary for containers. Substitutes have not yet been found. The shortage of raw rubber is already being felt seriously in local industries. Its price has risen 300 per cent in a short period. There is an extreme shortage of essential oils, among them citronella and lemon grass oils. The price of pine oil from the United States has risen by more than 100 per cent. The rising cost of linseed oil is also presenting serious problems to the paint industry. Farming costs are being affected by the shortage and increased prices of chemicals for pest control. The Union is now importing from Kenya much of the pyrethrum needed, but the prices of the raw material has also risen between 30 and 40 per cent.

A SERIOUS scarcity of salt in South Africa is foreseen by the chairman of the Northern Cape Chamber of Salt Producers. The scarcity has been made worse by the abnormally heavy August rains in the Northern Cape, which produces about 70 per cent of the Union's salt. Some orders for the tanning, soap, wood pulp and livestock feed industries have not been supplied. Salt production would normally have started some weeks ago. Production in the Orange Free State has also been checked by rain. It is not thought that there will be a serious scarcity of table salt, of which there are fair reserve stocks.

OIL company chiefs in Cape Town, with one exception, have said they know nothing of reported schemes by overseas oil companies to establish refineries in the Union. One, a director of the Vacuum Oil Co. of S.A., Ltd., did not deny knowledge of such a scheme, but had no comment to

make. It is thought in some quarters that the Vacuum Oil Co. may have decided to proceed with a shelved £12.5 million scheme to establish a big oil refinery at Durban which would be able to supply South Africa with about one-third of its petrol requirements. The Vacuum Oil scheme for Durban proposed the erection of a refinery on the Bluff industrial area and a pipeline linking it with the Durban oil wharves. The crude oil would have been shipped from the Persian Gulf or, if that source had been cut off, from Indonesia or Alaska. The project was shelved after the failure of negotiations between Mr. C. K. Gamble, then vice-president of the Standard Vacuum Oil Co., and the Union Government. They concerned concessions, including reduced railway charges for petrol.

VERY little bark is at present being stripped in the Natal wattle-growing districts and most growers are engaged in clearing and, in some instances, are extending their plantations. Growers aim at completing these operations before the start of the summer rains when stripping will again be undertaken.

PLASTICS INDUSTRY IN WESTERN GERMANY

(continued from previous page)

predominate and synthetic resins play a relatively small part.

Total products made by the spray-cast (Spritzguss) method have now passed the monthly target of 400 tons, and the figures are likely to increase rapidly in proportion to the availability of polystyrene and polyethylene. The process offers many possibilities, the products taking the place of glass and other ceramics and also finding use in refrigerating equipment and in household utensils. Only a small rise in purchasing power is needed in Germany for this section of the plastics industry to find a large and increasing market. Attempts, however, to introduce this class of plastic into the electrical industries have so far only met with partial success.

On the other hand the polyvinylchloride plastics have shown marked progress during the past eighteen months, especially in the textile, rubber and leather industries. It is considered that export prospects are good.

OVERSEAS

Cortisone Price Lowered

Merck & Co., New York, has recently reduced the selling price of cortisone from \$95 to 50¢ per gm.

International Chemical Congress

An international analytical and experimental chemistry congress is to be held in Paris from November 20-24 under the auspices of the Société de Chimie Industrielle, 28 rue St. Dominique, Paris 7e.

More Power for Canadian Aluminium

The Quebec Government has recently approved plans by the Aluminium Company of Canada for expenditure of \$30 million on the initial development of a 60,000 h.p. hydro-electric plant on the Peribonka River in Lake St. John district.

U.S. Crude Oil Production

Daily output of crude oil in the U.S.A. for the week ended September 30 was 5.835 million barrels, according to the American Petroleum Institute. This compared with 5.826 million barrels in the preceding week and 4.95 million barrels in the corresponding week of last year.

Uranium Ore Discovered in Canada

Discovery of a new source of uranium ore at North Shore Lake, Athabasca, Saskatchewan, was reported last week in the *Montreal Star*. Uranium oxide content of the ore is claimed to be as high as 40 per cent. The new field is of exceptional dimensions, covering 30 miles by 15 miles.

Finnish Nickel Deposits

Deposits of nickel ore are reported to have been discovered near Harjunpää village, north of Björneborg, Finland, which are considered to be more important than the occurrences at Petsamo which are now being exploited by the U.S.S.R. The ore is stated to contain 1.5 per cent nickel, 1 per cent copper, and traces of gold and platinum.

Industrial Formaldehyde Solutions

Solutions of formaldehyde in various types of alcohols are being made generally available for the first time by the chemical division of Celanese Corporation of America. The new products, being produced in a pilot plant at Bishop, Texas, is being sold as 55 per cent solutions of formaldehyde in methanol and 40 per cent solutions in butanol, propanol and methanol.

French Beryllium Deposits

Important occurrences of beryllium are reported to have been found in the commune of Bessines, Haute-Vienne, France.

Sulphur Deposits in Iraq

Deposits of sulphur are reported to have been discovered recently near Sulaimaniyah in Iraq. Three small deposits were discovered in 1947 in the neighbourhood of Basra and there are also occurrences near Kifri and Fata.

U.S. Cerium Deposits

The Molybdenum Corporation of America is at present sinking a shaft into the deposit of the fluorocarbonate mineral, bastnäsite, $6[(La, Co) FCO_3]$, which was discovered in California during 1949. It is hoped that the deposits will be sufficiently abundant eventually to make the U.S. independent of foreign sources of cerium and lanthanum.

Sharp Increase in Norwegian Chemicals

In the first eight months of this year industrial progress in Norway in terms of physical output showed an overall increase of 7 per cent over the corresponding period last year. Progress in the export industries has been particularly marked—16 per cent greater than last year. Among individual industries, the chemical industry showed the greatest progress with a production index figure of 157 (1938 = 100).

U.S. Aluminium and Zinc Quotas

Quotas for the export of aluminium and zinc for the last quarter of this year were established by the U.S. Government on October 9. The Commerce Department has provided for 7000 tons of aluminium and its products and 6500 of zinc and products. Earlier intentions to put a quota limitation on lead and its products for the fourth quota have not been carried out.

British Radar Installation for Norway

An expedition sent by the Norwegian Polar Institute has this summer installed Norway's first shore radar station, and what is probably one of the northernmost radar installations in the world, at Cape Linne in Spitsbergen. The station is expected to be of great assistance to vessels entering Ice Fjord on their way to Longyear City, the Norwegian mining settlement. The radar set is British, and a British expert helped to install and demonstrate it.

PERSONAL

THE Institution of Works Managers announces the election of the following officers for 1950-1:—Vice-presidents: **SIR MONTAGUE BURTON**, chairman of Montague Burton and Sons, Ltd., and **MR. A. G. RAMSEY**, chief engineer to the Ministry of Works. **MR. J. CONNELL**, manager of the Izal factory of Newton Chambers and Co., Ltd., becomes chairman in place of **MR. A. P. YOUNG**, who retires from the office which he has held for 16 years. **MR. C. N. POTTER**, works manager to Ilford, Ltd., has been elected deputy chairman in place of **MR. J. CONNELL**. **MR. J. M. WEIR**, formerly works manager, I.C.I. Dyestuffs Division, becomes hon. treasurer in place of **MR. R. G. BERCHEM**, managing director of Jeyes' Sanitary Compounds Co., Ltd.

The Mineralogical Society has announced that the following officers will be elected at the anniversary meeting of the society to be held on November 2. President: **PROFESSOR C. E. TILLEY**; vice-presidents: **DR. A. F. HALLIMOND** and **DR. S. J. SHAND**; treasurer: **MR. E. H. BEARD**; general secretary: **DR. G. F. CLARINGBULL**; foreign secretary and editor of the journal: **DR. L. J. SPENCER**.

The Pharmaceutical Society has awarded the Pereira silver medal to **MR. NORMAN DAVID HARRIS**, Clapham Common, London, S.W.4, who achieved distinction in this year's pharmaceutical chemist qualifying examination. Mr. Harris was awarded the B. Pharm. degree of the University of London in July.

MR. EDRYD JONES, Machynlleth, a graduate of Aberystwyth College, has been appointed soils chemist at Trawscoed, Cardiganshire, the Welsh headquarters of the National Agricultural Advisory Service.

MR. L. H. A. PILKINGTON, technical director of Pilkington Brothers, Ltd., was the speaker (on "Flat Glass") to the Midland Section of the Society of Glass Technology at Stourbridge recently. **SIR GRAHAM CUNNINGHAM**, chairman of the Triplex Safety Glass Co., Ltd., presided.

PROFESSOR J. W. COOK, F.R.S., Regius Professor of Chemistry in the University of Glasgow, has consented to serve on the University Grants Committee until December 31, 1954.

MR. R. E. WINTER has been appointed manager of the fan department of Air Control Installations, Ltd., as from October 1, in place of **MR. W. LEE**, who has left the company.

PHYSICISTS ELECTED

THE Institute of Physics announced the election, on October 12, of six new Fellows and 47 associates. The new Fellows are:—

J. M. BUIST (Manchester), **J. A. CLEGG** (Manchester), **S. M. COX** (Sunderland), **E. H. JONES** (Stockport), **M. P. LORD** (London), **G. E. ROTH** (New Zealand).

The new associates are these:

N. ADAMS (Manchester), **S. Z. ALI** (India), **D. BARBER** (Malvern, Worcs.), **I. J. BEECHING** (Gotham, Notts.), **P. BOMYER** (Coventry), **H. BUCKLE** (Manchester), **R. K. CAMPBELL** (Edinburgh), **J. A. CHALDRICK** (London), **A. CHARNEY** (Manchester), **T. CHARNEY** (Manchester), **E. W. CROMPTON** (Australia), **A. M. DOBSON** (Walham Cross), **G. W. DOLPHIN** (Reading), **J. K. DONOGHUE** (Widnes, Lancs.), **P. E. DOUGLAS** (Ilminster, Som.), **W. G. ELPORD** (Australia), **C. R. EVANS** (Manchester), **E. G. GAMBLE** (Cambridge), **F. A. GLOVER** (Reading), **F. A. GREENWOOD** (Rossendale), **G. W. HAMSTEAD** (Barnet, Herts.), **P. F. HANSON** (Luton, Beds.), **P. HARRIS** (India), **M. V. M. HERCHENRODER** (Mauritius), **D. C. HOOKWAY** (Birmingham), **R. M. HORSLEY** (Leeds), **V. C. HOWARD** (Chilwell, Notts.), **P. M. JEFFERY** (Australia), **E. KAY** (Farnborough), **P. D. LOMER** (Cornwall), **A. L. MACKAY** (London), **L. MANDEL** (London), **L. E. MUSSELL** (Sherwood, Notts.), **H. NARAIN** (Australia), **A. C. NICOLLS** (London), **D. J. OLIVER** (Sheffield), **D. J. PACEY** (London), **D. W. PASHLEY** (London), **F. A. ROBERTSON** (Lydd, Kent), **H. ROLFE** (Llanelli, Wales), **B. SCOTT** (Stoke-on-Trent), **G. STEPHENSON** (London), **D. J. SUTTON** (Australia), **T. C. TOYE** (Swansea), **D. H. TREVENA** (Talybont, Cards.), **G. C. WILLIAMS** (Grovesend, Glam.), **J. C. WILLIAMS** (Sunderland).

Neglected Plant Sources

MANY plants were growing wild in Ireland which could be cultivated for their medicinal properties, said Mr. Christopher O'Connor, M.P.S.I., in a paper read before the Pharmaceutical Society of Ireland in Dublin on October 9. Aconite, agrimony, foxglove, lavender, marsh mallow, valerian, yarrow, spagnum moss were indigenous examples, and non-indigenous plants would probably grow if introduced, he added. (Bella donna is already being cultivated in the Republic.)

Obituary

THE death is announced, at the age of 60, of Professor William Rearden Atkin, who occupied the Chair of Leather Industries at Leeds University, to which he succeeded in October last year on the retirement of Professor Douglas McCandlish. In 1912, at the age of 22, he was appointed to the Leeds University staff as research assistant to Professor H. R. Procter, then head of the leather industries department there. Professor Atkin held a lectureship in leather trades chemistry continuously until his appointment as principal. He was a past president of the International Society of Leather Trades' Chemists and hon. editor of its journal for a number of years.

HOME

Copper Price Change

The Ministry of Supply announces that from October 18 its buying price for rough copper in slabs of from 2.3 cwt. is raised from £156 to £170 per ton.

Wolfram Prices Reduced

The price of wolfram has been reduced twice within a week, on each occasion by 5s. Prices quoted on October 12, after the second reduction, were within the range of 235-245s. per unit.

Dearer Antimony

Prices of antimony were increased on October 16. The 99.6 per cent and 99 per cent metal were each raised by £20 to £235 and £225 a ton, respectively. Crude 70 per cent metal was raised by £15 from £165 to £180 a ton.

Record Tin Prices

Prices of tin touched new records during the week, but later remained steady. Settlement on the London Metal Exchange at the closing session on October 10 was £860. The price continued to rise on the two following days, reaching £885 for settlement on October 12. There was a moderate setback to £875 (settlement October 13) while the price remained steady on October 16 at £877 cash settlement.

Change of Address

On October 16 the address of the Association of British Pharmaceutical Industry became Tavistock House South, Tavistock Square, London, W.C.1. The telephone number, EUSton 2531/2, remains unchanged.

Export Control of Sulphur Materials

Export licences are now required for spent oxide, sulphur and certain sulphur mixtures, molybdenum and nickel in specified forms and alloys containing cobalt, molybdenum and nickel. This was notified by the Board of Trade in the Export of Goods (Control) (Amendment No. 6) Order, 1950, which came into effect on October 18.

Coal Production

Coinciding with the end of the miners' holiday season, last week's total production of coal increased by 43,500 tons over the previous week. Comparative figures are:—Last week: 4,329,500 tons (deep-mined 4,087,000 tons, opencast 242,500 tons). Previous week: 4,286,000 tons (deep-mined 4,069,200 tons, opencast 216,800 tons).

KID Exemption

The Treasury has exempted anisaldehyde and diphenylamine from Key Industry Duty from October 16 to December 31, 1950.

London Exhibition

THE CHEMICAL AGE and associated publications will be represented at the Dairy Show and Ice Cream Exhibition, Olympia, London, October 24-27.

Pharmacognosy Recognition Sets

Evans Medical Supplies, Ltd., draw the attention of students to the availability of their sets of crude drugs. Full details will be sent on request to the publicity manager, Speke, Liverpool 19.

Increased Cost of Whale Oil

The increased cost of whale oil is reflected in the Norwegian whaling companies' sale of 30,000 tons of whale oil to the Ministry of Food, at £100 a ton. This compares with 50,000 tons at £80 a ton sold to the M.O.F. by Norway in 1949.

Profit Sharing

Bonuses amounting to 6 per cent of their year's wages have been distributed under the firm's new profit-sharing scheme to employees of Quickfit and Quartz, Ltd., Stone, Staffs. The company is also establishing a pension fund and life assurance scheme for employees.

Salt Merger Proposed

The amalgamation of the Cheshire United Salt Co. with Palmer Mann and Co., which manages and acts as its selling organisation, is under consideration. The Cheshire United Salt Co., it is stated, is in a position to acquire the entire issued share capital of Palmer Mann and Co. for £275,000 (allowing for the costs of purchase and raising the requisite cash, for an estimated total of about £294,000).

Bid to Revive Coal Distillation Scheme

The Scottish Area of the National Union of Mineworkers is protesting against the decision of the Lanarkshire County Council not to attend the coal distillation conference which the union is organising at Hamilton, Lanarkshire, on October 29. The conference is intended to discuss ways of securing coal distillation plants in Lanarkshire, so that the coal measures there, considered uneconomic, should not be abandoned. All authoritative reports in the past on the distillation project have been adverse.

The Stock and Chemical Markets

INDUSTRIAL share dealings have presented a somewhat confused picture, produced by the widespread uncertainty regarding future economic conditions. The market as a whole, however, has remained active and was stimulated by the further rise in British funds. This, exemplified by the quotation of 97½ for 3½ War Loan, is associated with the economic improvements which have given rise to rumours of approaching revaluation of sterling. There is, of course, no authority for the assumption that an upward revaluation will take place in the near future.

In addition to the belief that higher taxation is inevitable next year, it is feared that the present sharp uptrend in materials prices must be affecting company earnings, and that the rearmament programme must increase inflationary trends.

Imperial Chemical fluctuated and have eased to 41s. 9. at the time of writing. Monsanto were firmer at 51s. 3d., Albright & Wilson were 29s. 9d., Brotherton 10s. shares 20s. 3d., Boake Roberts 5s. shares 31s. 6d. and Fisons have been more active around 27s. In other directions, Amber Chemical 2s. shares were 2s. 9d., F. W. Berk shares 11s. 6d., Bowman Chemical 5s. 3d., Pest Control 7s. 4½d. and Woolley 4½ per cent debentures 104½. W. J. Bush ordinary were 85s. 6d. and the 5 per cent preference 22s. 9d. Laporte Chemicals 5s. shares were more active around 10s. 4½d.

British Oxygen rallied to 92s. 6d., British Aluminium were firm at 44s. 9d., the 4s. units of the Distillers Co. 19s. 6d., but United Molasses eased slightly to 46s. 3d. Turner & Newall, at 84s., reflected market hopes that a higher dividend is in prospect. The 4s. units of British Glues & Chemicals eased to 20s. 9d., United Glass Bottle at 76s. 3d. were firm again, and Triplex Glass 10s. shares showed activity around 27s. 3d. British Xylonite were 83s. 9d., Klecman 1s. shares 10s. 4½d. and British Industrial Plastics 2s. shares 6s. 1½d., Glaxo Laboratories were still active, and at 51s. 3d. regained an earlier small decline.

The big success of the debenture issue, with a premium of 28s. 9d. over the issue price, helped Lever & Unilever shares up to 44s. There is also talk of higher dividend prospects if the Dutch Lever N.V. pays more. There is a dividend equalisation agreement between the two companies.

Only a moderate business has been done in iron and steel shares and those of companies on the nationalisation list remained

virtually unchanged and well below their scheduled take-over levels. Selling by holders who do not wish to exchange into the nationalisation steel stock has evidently continued. Prices are expected to move nearer the take-over levels before next February. United Steel, at 29s. 3d., have made very little response to the company's good results, the reflection of record output, but the dividend is limited to an unchanged 8 per cent by the Steel Act. Elsewhere, Staveley after improving, eased to 85s. 3d. Courtaulds were up to 39s. 6d. on the higher prices for rayon yarn, while British Celanese continued active up to 25s. in anticipation of the financial results and on talk of a higher dividend and a coming new issue. Oil shares were uncertain. Anglo-Iranian around £6½, Shell 65s. and Mexican Eagle, at 22s. 7½d., reflected profit-taking following the capital repayment news. Ultramar Oil were firmer at 17s. 10½d. in view of the improvement represented by the repayment of part of the loan from the Finance Corporation for Industry.

Market Reports

MOST sections of the industrial chemicals market have been active during the past week, with home buyers calling for spot parcels. Delivery specifications against contracts have continued up to schedule. Export inquiry has been well maintained and reports indicate an increasing volume of chemicals for U.S.A. and Canada. In many cases overseas requirements are difficult to meet because of the shortage of drums. Apart from the recent increase in the prices of copper sulphate and imported white arsenic, there have been no outstanding price changes for industrial chemicals; quotations are firm throughout the market. The call for non-ferrous metal compounds remains strong and a brisk routine demand is reported for most of the soda products and also potash chemicals. The coal tar products market shows little change from the strong conditions of last week. The supply position generally is not difficult and offers are finding a ready outlet. The demand for ADF cresylic acid is well maintained.

MANCHESTER.—New business on home and export account in heavy chemical products on the Manchester market during the

(continued at foot of following page)

Law and Company News

Commercial Intelligence

The following are taken from the printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described herein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages or Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

BALDWIN CHEMICAL SALES, LTD., Harlow. (M. 21/10/50). August 15, £4000 debentures; general charge.

BOWMANS CHEMICALS, LTD. (formerly BOWMANS (WARRINGTON), LTD., Widnes. (M. 21/10/50). September 14, mortgage and charge to National Provincial Bank, Ltd. charged on land and buildings at Widnes and Warrington, with plant, fixtures, etc., also a general charge. *Nil. January 24, 1950.

TILTMAN LANGLEY LABORATORIES, LTD., London, W. (M. 21/10/50). September 20, debenture to Barclays Bank, Ltd., general charge. *Nil. December 8, 1949.

WELINCOM, LTD. (formerly WELDED INDUSTRIAL COMPONENTS, LTD.), London, E.C. (M. 21/10/50). September 18, charge to Barclays Bank, Ltd., charged on 15 McKinley Road, Bournemouth. *Nil. December 31, 1947.

Satisfaction

YEOVIL DEGREASING CO., LTD., London, E.C. (M.S., 21/10/50). Satisfaction September 22, debentures registered November 19, 1948, to the extent of £5000.

Company News

Albright & Wilson, Ltd.

The directors of Albright & Wilson, Ltd., state that the recent issue of 2,028,164 5 per cent cumulative preference shares of £1 at par has been largely oversubscribed, the "rights" offer having accounted for more than 99 per cent.

Stream-Line Filters, Ltd.

Trading profit for 1949 was £42,272 (£24,442). After providing for taxation, £17,704 (£8700), and charges, there remains £9647. The dividend for year is maintained at 12 per cent.

Change of Name

An extraordinary general meeting of shareholders of the Péchiney group has decided to change its name from Alain, Froges et Camargue to Péchiney, Compagnie des Produits Chimiques et Electro-metallurgiques. The nominal value of the shares was increased from Fr. 625 to Fr. 2500.

Increases of Capital

The capital of the James B. Williams Co. (England), Ltd., has been increased by £49,900 beyond the registered capital of £100.

The capital of the Frome Chemical Company, Ltd., has been increased from £2000 to £5000.

New Registrations

Astell Laboratory Service Co., Ltd.

Private company. (486,031). Capital £2000. Suppliers of bacteriological culture media, glassware and apparatus. Director: J. R. Cuttall. Reg. office: 172 Brownhill Road, S.E.6.

W. B. Cole (Chemists), Ltd.

Private company. (486,188). Capital £1000. Manufacturing, pharmaceutical and general chemists, etc. Directors: Clara J. Cole, Claire J. Cole and J. E. Hutt. Reg. office: Swan Street, Sible Hedingham, Essex.

THE STOCK AND CHEMICAL MARKETS

(continued from previous page)

past week has been on a fair scale. There have also been a number of requests for delivery of outstanding orders. Substantial quantities of alkalis and other products are being taken up by the cotton and woollen industries, and there is a ready outlet elsewhere. There was a firm undertone to prices in nearly all sections of the market. In fertilisers, a steady trade was carried on in basic slag and its compounds. Light and heavy tar products were in good demand.

GLASGOW.—The Scottish heavy chemical market has been fairly busy over the past week and orders have been plentiful. Prices continue to rise, some of the items which have shown an increase being due to the increased cost of paper bags. Overseas business is slackening, principally owing to the fact that many chemicals are no longer available for export.

Next Week's Events

MONDAY, OCTOBER 23

Institution of the Rubber Industry

Manchester: The Engineers' Club, Albert Square, 6.15 p.m. "Engineering in the Rubber Industry" by E. Morris, M.I.Mech.E.

Institution of Electrical Engineers

Newcastle upon Tyne: Neville Hall, Westgate Road, 6.15 p.m. "Some Notes on Electrical Installations in Large Chemical Factories" by D. B. Hogg, M.B.E.

TUESDAY, OCTOBER 24

Society of Chemical Industry

London: Burlington House, Piccadilly, W.1, 5.30 p.m. "Flow Pattern in Furnaces" and film, "Film Flow" by Dr. J. H. Chesters.

Institute of Physics

London: 47 Belgrave Square, S.W.1, 5.30 p.m. "The Preparation and Publishing of a Scientific Paper" by Dr. H. R. Lang.

WEDNESDAY, OCTOBER 25

Institute of Physics

London: The Polytechnic, Regent Street, W.1, 3 p.m. "Technical Universities" by Lord Eustace Percy.

Institute of Chemistry of Ireland

Dublin: Trinity College, 7.45 p.m. "Editing for the Chemical Society" by R. S. Cahn, M.A.

British Association of Chemists

London: Wellcome Research Institute, 183 Euston Road, N.W.1, 7 p.m. "Research Aspects of Polyvinyl Chloride Plastics" by C. E. Hollis, F.R.I.C.

Chemical Society

Glasgow: Royal Technical College, George Street, 7 p.m. "Recent Developments in Macrocyclic Pigments" by Professor R. P. Linstead, F.R.S.

The Plastics Institute

London: Waldorf Hotel, Aldwych, W.C.2, 6.30 p.m. "The Limitations of Plastics" by Dr. V. E. Yarsley.

Manchester Literary and Philosophical Society (Chemical Section)

Manchester: Reynolds Hall, College of Technology, 5.30 p.m. "Stainless Steel" films in Technicolour by Firth Vickers & Co., Ltd.

Society of Chemical Industry (Food Group)

London: Burlington House, Piccadilly, S.W.1, "Factors in Distribution affecting the Quality and Nutritional Value of Foodstuffs" Dr. G. A. Reay, Dr. E. H. Callow, Dr. M. A. Pyke.

Manchester Metallurgical Society

Manchester: Engineers' Club, Albert

Square, 6.30 p.m. "Review of Current Research on Springs and Spring Steels" by R. S. Jackson.

British Association of Chemists

Birmingham: The University, 6 p.m. Meeting.

British Coke Research Association

London: Lecture Theatre of Royal Society of Arts, 6 John Adam Street, W.C.2, 2 p.m. Conference on "Coal Blending for Carbonisation in Coke Ovens."

THURSDAY, OCTOBER 26

Royal Institute of Chemistry

Edinburgh: North British Station Hotel, 7.30 p.m. "The Scientific Examination of Pictures" by Dr. A. E. Werner. (Jointly with CS and SCI.)

Manchester University: Chemistry Lecture Theatre, 6.30 p.m. Sixth Dalton Lecture, "The Physical Chemistry of Iron and Steel" by Sir Charles Goodeve, F.R.S.

Pharmaceutical Society

Manchester: Houldsworth Hall, 7.45 p.m. "Modern Developments in Pharmaceutics" by Mr. B. J. Thomas.

The Institute of Metals

Birmingham: James Watt Memorial Institute, Great Charles Street, 6.30 p.m. "Continuous Casting Practice." Discussion, to be opened by D. Wood, M.A., and R. Chadwick, M.A.

FRIDAY, OCTOBER 27

Electrodepositors' Technical Society

Sheffield: Grand Hotel, 6.30 p.m. "Education in the Electroplating Industry," by C. Harris.

Royal Institute of Chemistry

Cardiff: Royal Hotel. Dinner. (Jointly with SCI. S. Wales section).

Cambridge: University Chemical Laboratory, Pembroke Street, 8 p.m. "Science in Criminal Investigation" by Dr. G. E. Turfitt.

The Plastics Institute

Manchester: Engineers' Club, Albert Square, 6.45 p.m. Discussion Evening.

International Tin Conference

The Secretary General of the United Nations has invited member nations "to discuss measures designed to meet the special difficulties which exist or are expected to arise concerning tin and, if considered desirable, to conclude an international commodity agreement." The conference will open in Geneva on October 25. Two delegations will represent the U.K. and British colonial and dependent territories.

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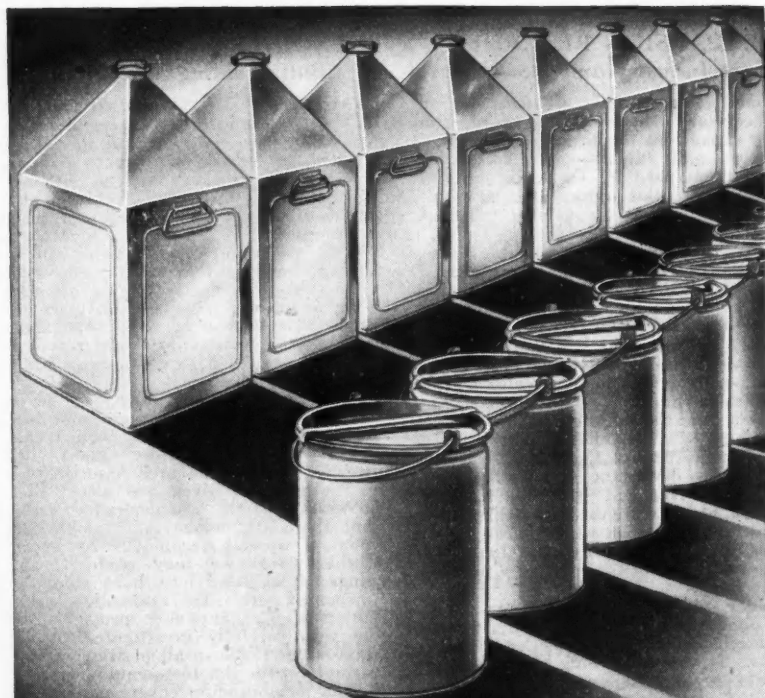
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EXPANSION RETARDED

Cement Industry and State Control

SOME factors which are deterring the cement industry from making the large expansions of output which current domestic and export conditions require were summarised by the chairman (Mr. F. R. Stagg) in his address to shareholders of the Ketton Portland Cement Co., Ltd., in Sheffield on October 12.

Opposition to the proposal to erect a cement works at Dove Holes, in the Buxton area of Derbyshire, had been raised and a public inquiry was held in July. The decision of the Minister of Town and Country Planning was still awaited, but if favourable, costs of fuel, power and cement-making machinery would have to be borne in mind.

Apart from the questions of finance and economics, said the chairman, the threat of nationalisation of the cement industry was a very disturbing factor. Since the vote on the Iron and Steel Bill, the Government had threatened nationalisation of almost everything on which it can lay its hands, and there seemed little doubt that cement was one of the industries foremost in its mind.

Under such conditions, said Mr. Stagg, the directors felt that they must move cautiously with the proposed developments. It would be wrong to shareholders to take a vital step without considering first the question: Are we going to be nationalised? and, secondly: If so, on what terms and conditions? They could not afford to take such a step in the dark.

"No Time to Waste"

LORD LYLE, president of Tate & Lyle, speaking to industrialists at Bournemouth last week on the far ranging threat of nationalisation, said: "Industries can be gobbled up with no more forewarning than the time it takes to lay a Bill before Parliament. The time to take action is now, before you find your own business named in a Parliamentary Bill."

"Trade and industry," he declared, "must persuade the public that free enterprise does not exploit its workers and rob the public; that it is not making too much money, and that its shareholders are not just parasites."

"Unless we can explode all this nonsense, then we are indeed lost. In the face of constant misrepresentations, free enterprise must state the facts clearly and boldly."

ENGINEERING STANDARDS

Butt Welding Steel Pipelines

SUCCESSFUL welding of circumferential butt joints in pressure pipelines by the metal-arc process calls for special techniques to secure consistent and satisfactory penetration without either the formation of cracks at the base of the welds or of icicles protruding into the bore of the pipe.

For consistent penetration and root fusion, two main methods are available. The first involves the use of a backing-ring which may be retained as part of the final joint or may be removable, and the second method requires a base run of weld metal deposited by the oxy-acetylene process.

The two themes are adequately covered, with diagrams, in "Recommendations for the Metal Arc Welding of Butt Welds in Steel Pipelines for Power Plant" (The British Welding Research Association, 2s.)

The methods given are stated by the BWRA to be the best generally available, but there are indications that the adoption of special techniques or specially trained workmen may enable backing-rings of oxy-acetylene base runs to be dispensed with. The association suggests, however, that any such proposal should be very carefully investigated to verify that welds made in all positions will consistently pass the test requirements.

The memorandum covers parent metal; welding methods; reinforcement of welds; supervision of workmanship; heat treatment after welding; tests for quality of butt joints, etc., and includes 28 illustrations.

New Flake Non-ionic Detergent

WHAT is claimed to be the first 100 per cent active flake non-ionic detergent to be produced commercially in the U.S.A. has been announced by the Wyandotte Chemicals Corporation, Michigan. It is one of a new series of non-ionics developed for special applications, including wool scouring and certain metal cleaning processes. Hitherto, in the U.S.A., non-ionic detergents have been offered only in the form of liquids, pastes, or wax-like solids. Use was made of a hydrophobic unit not previously used.

U.S. Rubber Programme

The first all-purpose synthetic rubber plant to be reopened under the U.S. Government's expanded rubber programme started production at Port Neches, Texas, on October 11.

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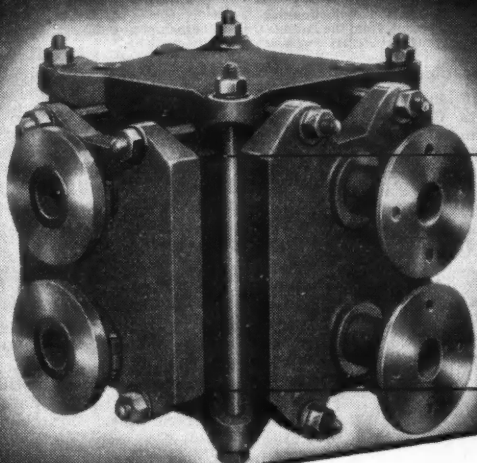
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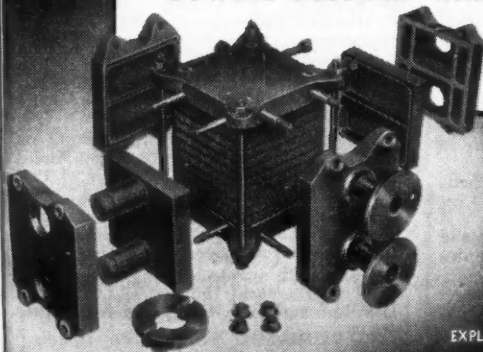
Heat Exchangers

A NEW DEVELOPMENT IN CARBON HEAT EXCHANGERS
FOR HIGHLY CORROSIVE CONDITIONS

The Powell Duffryn Cubic Heat Exchanger is a highly compact and robust design based on a "Delanium" carbon block with two series of holes at right angles to each other. This new design eliminates floating headers or sliding glands and overcomes the problems of brittleness associated with previous forms of Carbon Tube Heat Exchangers.

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EXPLODED VIEW

Patent Processes in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of specifications accepted will be obtainable, as soon as printing arrangements permit, from the Patents Office, Southampton Buildings, London, W.C.2, at 2s. each. Higher priced photostat copies are generally available.

Complete Specifications Accepted

Process for the production of isoquinoline derivatives.—R. T. Servita Gyogyszergyar es Vegyipari, G. Bruckner, G. Fodor, and J. Kiss. Oct. 8 1947. 645,189.

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Reduction and sintering of moulded bodies containing reducible metal compounds.—D. Primavesi. Dec. 29 1947. 645,080.

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Process for the emulsion polymerisation of styrene.—Monsanto Chemical Co. Feb. 16 1948. 645,034.

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Process for the preparation of thioketones and carbocyanine dyes.—Kodak, Ltd. Feb. 24 1948. 645,288.

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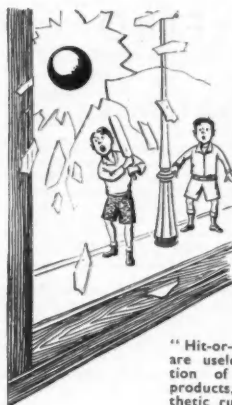
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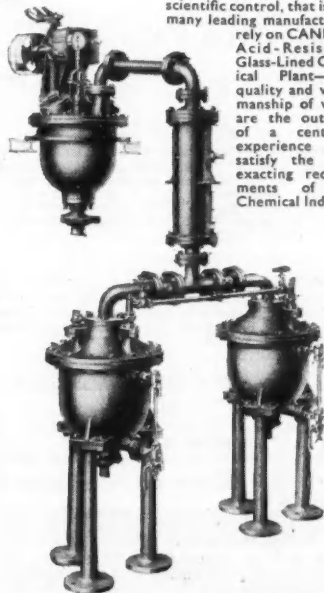
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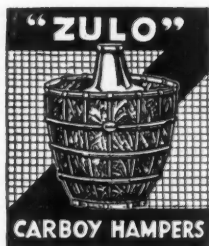
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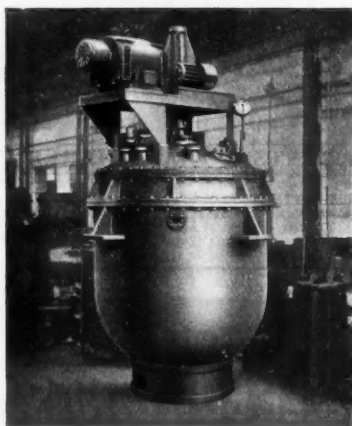
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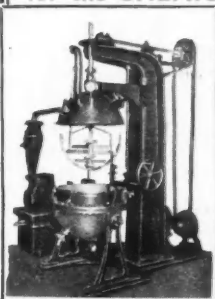
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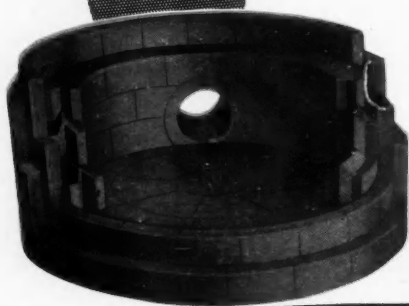
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